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FOOD AND HEALTH EXPENDITURE PATTERNS
IN URBAN AND RURAL ECUADOR:
ANALYSIS OF HOUSEHOLD BUDGET
SURVEY DATA

Maarten D.C. Immink

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NUTRITION ECONOMICS GROUP

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Office of International Cooperation and Development
Technical Assistance Division

U.S. Department of Agriculture

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Executive Summary

1. This report presents results of a statistical analysis of one urban and two rural household budget surveys conducted in Ecuador during the latter part of the 1970's. The primary purpose of the analysis was to estimate food and health expenditure patterns of different urban and rural population groups in order to assist Ecuador with the formulation of food, nutrition and health policies to be included in national development plans.

2. The Urban Household Budget Survey (UHBS) was conducted during the period July 1975-June 1976 in 25 cities in the highland and coastal regions. A total of 9,518 households were interviewed, 51.6 percent residing in 11 coastal cities, and the remainder in 14 highland cities. A multi-stage sampling procedure was applied.

3. The Rural Household Budget Surveys (RHBS) were conducted during the period September 1978 - April 1979 (RHBS I) and April - October 1979 (RHBS II). During the RHBS I, 4,385 households were interviewed, 41 percent in the Coast, 54.4% in the Highlands and the remainder in the Oriente region. The same households were re-interviewed during the RHBS II when the total sample was 4,074 households. A multi-stage sampling procedure was applied, with replacement of 474 sample households (10.8%) during RHBS I, and no replacement during RHBS II. Because of the low numbers of sample households in the Orient region, these were excluded from further analysis.

4. Separate data files were created for each survey, extracting from the raw data sets only those data needed for the analysis: UHBS: 201 variables; RHBS: 413 variables, for each round. In each case the variables which were created can be distinguished as stratification variables and food and

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health expenditure variables. The stratification variables can be divided as: macro-variables (region, city size) and micro-variables (household demographic and socioeconomic characteristics). The food and health expenditure variables consisted of total food expenditures, expenditures on a key foods group (41 foods in UHBS, 45 foods in RHBS), expenditures on a number of food items from the key foods group selected on the basis of high reporting frequency, total health care expenditures, and expenditures on a number of health care categories again selected based upon high reporting frequency.

5. The urban sample was stratified by region (coast, highlands) and by city size (< 40,000 inhabitants, > 40,000 inhabitants, Quito, Guayaquil). The rural samples were stratified by region, and farming status (yes/no). The primary demographic characteristic selected was household life cycle stage, while food and health expenditure variables were adjusted for total household size. In order to select an appropriate variable to stratify for socioeconomic status (SES), factor analysis was applied to determine which variable(s) represented the same dimension of SES as household income. For the urban sample the number of household appliances present was selected as the primary SES variable; for the non-farming households: number of facilities present (water, electricity, toilet), while for the farming households the land area under cultivation was used to stratify for SES.

Food Expenditure Patterns.

6. Urban households spent on the average 45 percent of total household expenditures on food. The average expenditure share of food decreased with city size, but did not significantly differ between highland and

coastal cities of similar size. Expenditures on milk, rice, bread and beef commanded relatively high food budget shares among households residing in highland and coastal cities of different sizes. Comparing coastal and highland households residing in cities of similar size, the former spent a relatively larger share of their food budgets on rice, beef, vegetable lard, onions, tomatoes, and plantain while the latter a relatively larger share on bread, eggs, milk and potatoes.

7. The average expenditure share of food was shown to decline with SES levels among highland and coastal households residing in cities of different sizes. Expenditures on milk, cheese and eggs commanded greater shares of food budgets at higher SES levels of highland households in cities of all sizes, while expenditures on rice (except in Quito), sugar and ground coffee demonstrated declining food budget shares with higher SES levels. Among coastal households, expenditures on milk and eggs commanded increasing, and on rice, vegetable lard, potatoes, plantain, sugar and ground coffee decreasing, shares of food budgets at higher SES levels.

8. Average expenditure shares of food across different household life cycle stages tended to peak at stage 4, and declined thereafter among highland and coastal household residing in cities of different sizes. The same inverted U-shape pattern across household life cycle stages of average food budget shares was shown for rice, bread, beef and potatoes among highland urban households, and for vegetable lard, bread and plantain among households in big coastal cities, and for beef among households in Guayaquil.

9. Expenditure elasticity coefficients were estimated, and were found to be .63 for all foods, and 57 for the key foods group. Food commodities with

the highest expenditure elasticities were eggs, milk and cheese, and with the lowest: rice, vegetable lard and plantain. There was no significant difference in the marginal expenditure share of foods between highland and coastal cities of the same size. The marginal expenditure shares of rice and plantain were relatively higher among highland urban households, and of beef, vegetable lard, bread, milk, eggs, cheese, onions, tomatoes and potatoes relatively higher among coastal urban households. The expenditure elasticity coefficients of food, and of the key foods group, were consistently higher among low-SES than among high-SES households. There were significant differences in marginal expenditure shares of individual food items between coastal and highland urban households when holding their SES level constant.

10. Rural households spent on the average 52 percent of total expenditures on food, and 44 percent on the key foods group which amounted to about 83 percent of total food expenditures. The average food budget shares of bread, noodles, milk, potatoes and sugar were higher for highland households, while of rice, beef, cheese and plantain were higher among coastal households. There were few differences in average food budget shares between farming and non-farming households. Among the latter the average expenditure shares of foods and of the key foods group declined with the SES levels of both highland and coastal households. The average food budget shares of rice, vegetable lard and sugar decreased, and of bread, beef, eggs, cheese and milk increased, with the SES of highland, non-farming households, while among coastal, non-farming households, the average food budget shares of rice, noodles, onions, vegetable lard and sugar declined, and of bread, eggs and milk increased with SES levels.

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11. Highland farming households spent from 54 percent (small landholdings) to 44 percent (large landholdings) of total expenditures on food; for coastal farming households the same range is from 60 to 47 percent. Expenditures on the key foods group remained a constant percent of food budget of farming households with different sizes of landholdings. Among highland farming households, the average food budget shares of bread, noodles, milk and potatoes decreased, and of beef and vegetable lard increased, with the size of landholdings. The pattern among coastal farming household differed: average food budget shares of rice, cheese and plantain decreased, and of beef increased, with size of landholding. Farming households residing in the coast and in the highlands spent on the average a smaller share of their food budgets on food commodities when household production was a source of food supplies.

12. The expenditure elasticity of foods ranged from .77 to .80, and of the key foods group from .72 to 79 among all rural households. The marginal expenditure shares of all frequently reported food items were below one and were relatively high (> .5) for rice, bread, beef, eggs, milk and onions. The marginal expenditure shares of food and of the key foods group were higher among highland households than in the coast, and relatively higher among highland farming than highland non-farming households.

13. Among rural households residing in the highlands the marginal expenditure shares of eggs, beef, cheese, tomatoes, and plantain for non-farming households exceeded those for farming households; the opposite differences was observed in the marginal expenditure shares of rice, bread, milk, potatoes and sugar. The expenditure elasticities of milk, rice, noodles, vegetable lard, onions, plantain and sugar were

relatively higher among coastal farming than non-farming households; the marginal expenditures shares of bread and beef were relatively higher for the latter group.

Health Expenditure Patterns.

14. Urban households spent on the average 3.3 percent of total household expenditures on health care, though 42 percent of the households reported no health care expenditures. Expenditures on medicines and drugs represented on the average 64 percent of the household health budget, on outpatient visits 16.5 percent, and on dental care: 7.4 percent.

15. Mean per capita health expenditures tended to increase with city size, and tended to be higher among households residing in highland cities. The average expenditure share of health care was relatively constant across regions and city size. The average health budge share of outpatient visits was higher among Quito households than in other highland cities, higher in small coastal cities than in larger coastal cities or in small highland towns. The average health budget share of dental care was relatively higher in highland cities, but constant over city size. The same was true of the average health budget share of medicines/drugs among highland households, among coastal households the average health budget share of medicines/drugs was highest among households residing in large cities.

16. Mean per capita annual health expenditures increased with higher SES within highland and coastal cities of different size. The same pattern was observed for mean per capita expenditures on outpatient visits, dental care and medicines/drugs.

17. There were significant regional differences in the patterns of average expenditure shares of health care, and of average health budget shares on outpatient care, dental care and medicines/drugs across SES levels. The average expenditure share of health care decreased with SES in small highland towns, first increased then decreased with higher SES in larger highland cities, and increased with SES among Quito households. Among coastal households the average expenditure share of health care increased with SES among households in small towns and in Guayaquil, but remained constant with SES in large cities. The average health budget shares of outpatient and dental care, and of medicines/drugs did not demonstrate consistent patterns with SES in either region or with city size.

18. Among all urban households, the marginal budget shares for all health care and for dental care were relatively high (.85), while lower for outpatient care and medicines/drugs. The expenditure elasticities of all health care and of outpatient care showed significant variation among highland cities of different size, the expenditure elasticities of dental care and medicines/drugs showed considerably less variation. The marginal budget shares of all health care and of each of the three separate health care categories were relatively high for households in Guayaquil relative to other coastal and to highland cities.

19. Eighty-six percent of the RHBS I households and 92 percent of the RHBS II households, reported health expenditures. Total health care expenditures accounted for 6.1 to 6.9 percent of total household expenditures. The health care categories with the highest reporting frequencies were: (a) outpatient visits (RHBS I: 37%; RHBS II: 37.3%), (b) over-the-counter drugs (RHBS I: 53.1%; RHBS II: 70.4%), and (c) medicines/vitamins (RHBS I: 47.3%; RHBS II: 50.5%).

20. The average budget share for health care was in the RHBS I the highest among coastal farming households and lowest among highland non-farming households, with no difference between coastal and highland non-farming households. Much less variation in average budget shares of health care between regions and by farming status was seen for the RHBS II. The average health care budget share of outpatient visits was relatively higher among coastal households, and of over-the-counter drugs highest among highland farming households, and lowest among coastal non-farming households.

21. The average budget share of health care decreased with SES among coastal non-farming households, but remained constant across SES levels of highland non-farming households. The opposite pattern was observed for farming households, where the average budget share of health care increased with SES among highland households but not necessarily among coastal households. Both among farming and non-farming households the relative health budget shares of over-the-couonter drugs tended to decrease, and of medicines/vitamins to increase, with higher SES levels.

22. The marginal expenditure share of health care approximated one among all rural households, was lower among highland non-farming households than among highland farming and coastal rural households. Of the three health care categories, expenditures on over-the-counter drugs are not likely to increase significantly in response to increases in total household expenditures. Expenditures on outpatient care and on medicines/vitamins are more responsive to increased household expenditures. There were some differences in the expenditure elasticities of the three health care categories by region and farming status.

List of Tables

List of Acronyms

CONADE   National Development
                               Council, Ecuador

INEC   National Institute of Statistics
                               and Census, Ecuador

RHBS   Rural Household Budget Survey

SES   Socioeconomic Status

SPSS   Statistical Package for the Social Sciences

UHBS   Urban Household Budget Survey

USAID   U.S. Agency for International Development

I. INTRODUCTION

This report provides the results of a statistical analysis of three national household budget surveys conducted in Ecuador during the latter part of the 1970's. The primary purpose of the analysis is to estimate food and health expenditure patterns of different urban and rural population groups. Beyond estimating expenditure shares allocated for food and health, expenditures on selected food items and on a number of health care categories are estimated. The broader purpose of the analysis is to assist Ecuador with the development of a food and nutrition policy for inclusion in the national development plan.

In connection with the above, the author undertook two missions to Ecuador during 1983. The first mission, which lasted 4 weeks, was primarily undertaken to assist the USAID Mission in Quito and the Nutrition Unit of the National Development Council (CONADE) with the assessment and preliminary analysis of the household budget data compiled by the National Institute of Statistics and Census (INEC). The findings and recommendations of this mission have previously been reported and constituted the basis for the second mission (1).

The specific terms of reference for the second mission were:

(a) To create master data files to contain regional, demographic and socioeconomic variables as well as quantities and values of selected foods purchased and allocated from home production;

(b) Using standard statistical techniques, to describe food purchasing patterns by stratified population groups and identify population groups with internally consistent food expenditure patterns;

(c) To describe the income-food expenditure relationships by stratified population groups, using appropriate statistical techniques;

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(d) To make recommendations, based upon the analysis of the household
budget surveys, related to the relative cost-effectiveness of
targeted food and nutrition policies, programs and projects.

The consultant also was requested to extend the analysis to health
expenditure patterns using the same data sets and master data files as
created for the food expenditure study. Specifically, the consultant
was asked:

(a) to describe health care expenditures by population strata;

(b) to describe the income-health expenditure relationships by
stratified population groups; and

(c) to provide recommendations for further analytical work related
to health care expenditures using household budget surveys.

While in Quito and in preparation for compiling this report, the
consultant undertook the following activities:

(a) held meetings with professional staff members of CONADE, INEC,
and USAID/Quito;

(b) designed and created data files for statistical analysis;

(c) performed data editing and data transformation tasks, and
preliminary statistical analysis using the Statistical Package
for the Social Sciences (SPSS);

(d) documented all data files and the variables they contain;

(e) consulted secondary data sources compiled by governmental agencies
and USAID/Quito to extract background material to be included in
this report; and

(f) provided training in data editing, SPSS subroutines and in
interpretation of statistical results to a staff member of
CONADE's Nutrition Unit.

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implementation, and to the formulation of appropriate food and nutrition policies, are also presented.

2.   BACKGROUND: ECUADOR.

Ecuador is classified as a middle-level developing country with substantial petroleum resources, and a climate and land endowment suitable for a highly productive agricultural sector. Ecuador's total land area is 284 thousand square kilometers with climates ranging from the tropical Amazon basin and coastal plains to the cold of the Andes. The total population as of mid-1983 was estimated at 8.8 million, 45 percent of whom live in urban areas. The crude birth and death rates are estimated at 4.1 and 1.0 percent respectively and the population grows at an annual rate of 3.2 percent (2). The infant mortality rate is 81/1000 which is similar to that of Brazil and Peru, and slightly higher than the average for tropical South America (73/1000). Life expectancy at birth is 61 years which is comparable to the average for tropical South America (62 years).

Per capita GNP was estimated in 1981 at US $1,171, well below the average for all of tropical South America (US $2,065)(2). Per capita income levels tend to be higher in the coastal regions than in the highlands. It has been shown that household incomes in urban areas are fairly unequally distributed; the Gini index reported for Quito and Guayaquil were .518 and .489 respectively (3). These were higher than those reported for cities such as Caracas (.429), Maracaibo (.437), Bogota (.472), Barranquilla (.463) and Santiago (.451). Rural incomes show a greater degree of inequality than urban incomes. It has been estimated that the lower quartile of the urban and rural populations (ordinarilly ranked by income level) receive approx 4.3 and

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3.0 percent of labor income, while the upper quartiles receive 57.5 and 70 percent, respectively (4). Further evidence of significant urban-rural disparity in levels of living is provided by the fact that of all urban housing units it was found that 83.4 percent had potable water, 84.3 percent had electricity and 84.0 had toilet facilities; the same percentages for rural housing units were: 15.1, 11.6 and 13.2 percent (5). Access to these basic household services in rural area was usually better in the highlands than in the coast.

Access to land is also highly unequally distributed in rural areas. Twenty-nine percent of all landholdings consisted of less than 1 hectare each and as a group comprised in 1974 about 1 percent of the total land area under cultivation (4). And 0.3 percent of all landholdings consisted of 500 hectares or more and comprised 29.5 percent of total cultivated land area. Land concentration tends to be higher in the highlands than in the coast (4.) Net farm income per hectare utilized has also been shown to vary inversely with the size of landholding in rural Ecuador (4).

Urban households in Ecuador, particularly in Quito and Guayaquil, have been shown to spend thirty-eight percent of all expenditures on food and beverages, with this expenditure share being higher in Guayaquil (41%) than in Quito (34.4%) (3). Food groups the expenditures on which constituted a high percent of total urban food budgets were, in order: meat and poultry, cereals, dairy products and eggs, and vegetables and tubers. Expenditures on medical care amounted to 2.5 percent of total household expenditures, 2.9 percent among households in Quito and 2.1 percent among Guayaquil households (3). The expenditure elasticities of food and medical care were shown to be .67 and .90 respectively.

Table A.3.1

Urban Household Budget Survey, 1975/76
geographic distribution of sample households.

REGION:	CITY:	No. of HOUSEHOLDS:	PERCENT	
			TOTAL:	REGION:
COAST	Guayaquil	1,421	14.9	29.0
	Portoviejo	456	4.8	9.3
	Esmeraldas	603	6.3	12.3
	Machala	588	6.2	12.0
	Manta	533	5.6	10.9
	Catamara	67	0.7	1.4
	Naranjal	129	1.4	2.6
	Rocafuerte	86	0.9	1.8
	Ventanas	141	1.5	2.9
	Balzar	242	2.5	4.9
	Babahoyo	642	6.7	13.1
	TOTAL	4,908	51.6	100.0
HIGHLANDS	Quito	1,120	11.8	24.3
	Ambato	622	6.5	13.5
	Riobamba	483	5.1	10.5
	Cuenca	600	6.3	13.0
	Loja	484	5.1	10.5
	Saraguro	108	1.1	2.3
	Gualaceo	188	2.0	4.1
	Girón	90	0.9	2.0
	Pujili	119	1.3	2.6
	Cañar	90	0.9	2.0
	Machachi	83	0.9	1.8
	San Gabriel	193	2.0	4.2
	Guaranda	136	1.4	3.0
	Latacunga	294	3.1	6.4
	TOTAL	4,610	48.4	100.00
TOTAL		9,518	100.0	

No rural household budget data are available, so little is known about spending behavior of rural households in Ecuador. Data which allow an assessment of food intake patterns, and of the nutritional and health status of urban and rural populations are also scarce and highly outdated. Average daily energy intake for Ecuador was estimated at 1948 kcals. (1971-73), and average daily protein intake at 43 grams (4). The prevalence of first-degree malnutrition among children less than 5 years, based upon weight for age, was found to be higher among rural than urban children, but equal for second and third degrees of malnutrition. Among rural school children, 46 percent were classified with weight deficiency, and 19 percent with malnutrition (4).

General and infant mortality rates have been declining during the 1960's and 1970's in rural Ecuador, while access to health care facilities have also improved (4). Population per rural health care facility declined in the highlands from 9,122 in 1970 to 6,576 (in 1977), and in the coast from 11,922 to 8,977 persons. Rural health facilities attended a smaller percent of the population in 1974 (7.3%) than in 1970 (7.8%), with most of this decline in the highland areas.

3. METHODS AND MATERIALS

This section describes: (a) the household budget surveys which generated the data; (b) the data sets which formed the basis for the analysis, and (c) the statistical methods which were employed in the analysis.

3.1 Description of the Household Budget Surveys

3.1.1. Urban Household Budget Survey, 1975/76

The urban survey (Presupuestos Familiares de Area Urbana) was under-taken during the period July 1975 - June 1976 in 25 cities in both the

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highland and coastal regions. Cities in the Oriente region and the Galapagos were not included. A total of 9,518 households was interviewed, 51.6 percent of these were located in coastal towns.

The stated purposes for undertaking the survey were (6):

i. To determine important demographic and socioeconomic characteristics of urban households. To estimate income levels and expenditure patterns and to relate these to demographic and socioeconomic households characteristics.

ii. To estimate consumption baskets, and to calculate the relative weights of different commodities in these baskets.

iii. To provide certain data to be incorporated in the national income accounts.

iv. To estimate levels of living by geographic location and by income levels and expenditure parameters (average propensities to spend, income elasticities of expenditures) which will provide an input into the formulation of income and social welfare policies.

Sample Selection

Based upon the Population and Housing Census of 1974, 86 towns with at least 1,000 inhabitants were identified. All these are located in the highland and coastal regions, and constituted the sampling frame. The towns were classified into two groups:

(a) self-representing ("auto-representadas"): towns with at least 40,000 inhabitants and an university, and

(b) not self-representing ("no-autorepresentadas"): towns with less than 40,000 inhabitants or without a university.

There were 5 cities in each region which fulfilled criterion (a), and all ten were included. From among the remaining 76 towns which belonged to group (b), 15 were selected, 9 of these located in the highland region. The selection procedure applied was a stratified random sampling, with 3 size classifications (1,000-5,000; 5,000-10,000, and more than 10,000 inhabitants) constituting the strata.

For the group (a) towns, a two-stage sampling procedure was applied. The first-stage sampling was at the block ("manzana") level: within each selected block, homes were selected at random. Blocks were selected using a stratified proportional sampling procedure, where block size (= number of homes) constituted the strata.

A two-stage sampling procedure was also applied in the group (b) towns. Neighborhoods ("conglomerados") and homes within the selected neighborhoods were chosen at random. Thus, the unit of measurement is the household. It is not clear what procedures were followed in the event that a multi-household dwelling was selected.

Geographic Distribution of Sample Households

Of the total 9,518 households selected, 4,908 (51.6 percent) were located in 11 coastal towns and 4,610 in 14 highland towns (Table A.3.1.). The highest concentration of sample households was in Guayaquil (14.9%), followed by Quito (11.8%).

We compared the distribution of sample households to the distribution of the urban population in the sample towns, reported in the 1974 Population Census (Table A.3.2.). Assuming no differences in household size between the coastal and highland regions, and between towns of different size, it appears that:

(a) the proportion of the sample households located in the highlands (48.5%) closely corresponded to the proportion of the population in the sample towns located in the highlands (45.2%);

(b) the population in Quito and Guayaquil may have been underrepresented, while

(c) the population in the sample towns other than Quito and Guayaquil may have been over-represented.

3.1.2.   Rural Household Budget Surveys, 1978/79

The rural household budget survey (Encuesta de Ingresos y Gastos de los Hogares del Area Rural) was conducted in two separate rounds during the period September 1978 - October 1979.   The first round was completed during the period September 1978 - April 1979, and 4,385 households in the coastal (41.0%), highlands (54.4%) and Oriente (3.6%) regions were interviewed (Table A.3.3.).   Because of the small number of households in the Oriente region, these were excluded from the analysis.   Further stratification by socioeconomic indicators would result in small cell frequencies, making thus statistical inferences difficult.   The percent of sample household interviewed per month varied from 19 percent in November 1978 to two percent in April 1979.   There was also variation between regions in the percent of total sample households interviewed per month.   The timing of the interviews during the survey period also differed between the two regions.   Nineteen percent of the highland sample households were interviewed during the first two months, versus 36 percent of the sample housholds in the coastal region.

The second round of the survey was initiated in April 1979, and was completed in October 1979.   This round of interviews was repeated in the same sample households as were included in the first round.   A total of 4,074

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household were interviewed, including 128 households in the Oriente region which are excluded again from analysis. The same instrument was used in the two rounds of the survey. There seems to be less month-to-month variation in the number of interviews completed in round 2. There also was less variation between regions in the timing of the interviews during the survey period.

The stated objectives for the survey are as follows (7):

i.   To obtain data on the incomes and expenditures of rural households. To determine levels and sources of income and expenditure patterns, and relate these to demographic, geographic and socioeconomic characteristics of rural households.

ii. To obtain data on production, sales, self-consumption, labor and other inputs, investments of agricultural production units (UPA: "unidad de produccion agropecuaria"), and to estimate farmgate prices.

iii. To have the above data serve as inputs into the formulation of national and regional development plans, and to improve the national income accounts, and the analysis of income distribution and expenditure patterns.

iv. To relate socioeconomic indicators to levels of living among the rural population.

Sample selection

The total needed sample size had been calculated as 4,402 households. A two-stage sampling procedure was implemented. The primary sampling unit was the sector, of which 300 were selected. Each sector was selected with a probability proportional to its size, determined by the number of dwellings it contained as reported in the 1974 Population and Housing Census. Each sector

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was identified by economic regions, province, county ("canton") and district ("parroquia").

The secondary sample units were the dwellings which were selected at random in each of the 300 sectors. Excluded were dwellings which were permanently unoccupied, or inhabitable. It is not clear how multi-household dwellings were treated.

In the first round, 474 sample households (10.8%) initially selected were replaced. The reasons for replacement were: (a) indefinite absence from the home (8.8%), refusal to be interviewed (0.5%), and other reasons (1.5%). The final sample size of round 1 was 4,384 or 99.6% of the calculated sample size. In round 2, no replacement of sample household took place; the final number of households interviewed was 4,074 or 92.5% of the calculated sample size.

Geographic Distribution of Sample Households

Roughly fifty-eight percent of the sample households were located in the highland provinces, with the province of Pichincha having the highest percent (10.5%). Among the coastal provinces, Manabi and Guayas had the highest percents (Table A.3.4.).

In order to investigate whether the survey results may be representative for the whole rural population of Ecuador, we compared the regional distribution of sample households with the same distribution of the rural population as reported in the 1974 and 1982 Population Census (Table A.3.5.). There seems to have been a slight shift of the rural population to the highland region (1.6%) between the two census years. Assuming that there is no difference in average household size between the total rural population as a whole and the

sample populations in each region, it appears that the highland rural population may be slightly overrepresented by the survey.

As was indicated previously, 311 (7.1%) fewer households were interviewed in round 2. Of these, 30 had been located in the Oriente region. The main reason for the decline in number of households interviewed was permanent migration (5.8%); other reasons included refusal to participate, temporary absence, and merging of sample households into one. Sample households were not replaced in round 2. There seems to be some regional selectivity in the number of households which dropped out during the second round. The highland sample was reduced by almost 9 percent, while the coastal sample by 5 percent. The highest percent of the sample households that dropped out occurred in Guayas (19%), the lowest percent in Carchi (3%). The province with the highest relative reduction in sample was Esmeraldas (9.1%) and Carchi was the province with lowest relative reduction (2.9%).

3.2. Data Description and Variables

3.2.1. Urban Household Budget Survey, 1975/76

The data set which contains the raw data of the Urban Household Budget Survey 1975/76 (UHBS), consists of seven different card types. Household as well as individual data are contained on these cards. With the exception of the first card, the number of records per case (household) varies for all cards. The card types are described in Table 3.1. Data contained on four cards were included in four separate card files and each, after suitable transformations of the raw data into variables, was converted into a SPSS system file. The individual system files were merged into one master file ('PFAU1') which contains 201 variables for 9,518 cases.

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Table 3.1
Organization of raw data set by different card types,
Urban Household Budget Survey, 1975/76

Card Type: Data Description:

   1*   Household:
                                    1. Household size
                                    2. Housing characteristics
                                    3. Presence of consumer durables

                                    Head of Household:
                                    1. Sex, age, marital status
                                    2. Education, occupation
                                    3. Annual total income

   2*   Each Income-Receiving Member:
                                    1. Family position, sex, age, marital status
                                    2. Education, occupation
                                    3. Annual monetary income
                                    4. Annual non-monetary income

   3*   Each Member Not Receiving Income:
                                    1. Family position, sex, age, marital status
                                    2. Education, occupation

   4*   Each Good/Service Purchased:
                                    1. Code of good/service
                                    2. Quantity purchased
                                    3. Unit of measurement
                                    4. Value (annual equivalent)
                                    5. Value purchased on credit

   5   Each Income-Receiving Member:
                                    1. Source of income
                                    2. Annual income from each source

   6   Each Income-Receiving Member:
                                    1. Financial transactions:
                                        savings, borrowing, etc.
                                    2. Type of transaction
                                    3. Annual amount of each type of transaction

   7   Household Members other than included on
                                    Card Type 2 and 3:
                                    1. Family position, sex, age, marital status
                                    2. Education, occupation

* Variables used in the analysis were constructed with data from these card
  types.

The variables which were created for the analysis can be distinguished as: (a) stratification variable, and (b) food and health expenditure variables. The stratification variables can be divided into:

    i.   location
    ii. demographic characteristics
    iii. socioeconomic characteristics

The location variables are:

(a) Region: highlands, coast

(b) City size:

    - less than 40,000 inhabitants
    - more than 40,000 inhabitants (excluding Quito and Guayaquil)
    - Quito, Guayaquil

Demographic characteristics include:

(a) Household size:

    - less than 4 persons
    - 4 or 5 persons
    - 6 or 7 persons
    - 8 or more persons

(b) Household life cycle stage:

    stage 1: - age of head: less than or equal to 40 years
              - no children under 6 years present
              - no children between ages 6-19 present

    stage 2: - age of head: less than or equal to 40 years
              - at least 1 child under 6 years present
              - no children between ages 6-19 present

    stage 3: - age of head: less than or equal to 40 years
              - at least 1 child between ages 6-19 present

    stage 4: - age of head: greater than 40 years
              - at least 1 child under 6 years present

    stage 5: - age of head: greater than 40 years
              - no child under 6 years present
              - at least 1 child between ages 6-19 present

    stage 6: - age of head: greater than 40 years
              - no children under 19 years present

The socioeconomic indicators are:

(a) occupation of head of household:

    - professional/managerial
    - skilled

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        - semi-skilled
        - unskilled

(b) formal education of head of household:

        - university studies
        - 6 grades completed
        - 1-5 grades secondary school
        - 6 grades secondary school completed
        - 0-5 grades primary school

(c) housing construction:

        - reinforced concrete and/or brick
        - wood and brick, or only wood
        - other: cane, mud, dirt, straw

(d) presence of water, electricity and toilet:

        - all three present
        - not all three present

(e) housing density:

        - one or less person/room
        - 1.1 - 2.5 persons/room
        - more than 2.5 persons/room

(f) presence of electrical appliances:

        - three or more (total:5)
        - two
        - one
        - none

(g) household income groups:

        - s/. 180,000 or more/year
        - s/. 180,000 - 96,000/year
        - s/. 96,000 - 60,000/year
        - s/. 60,000 - 36,000/year
        - less than s/. 36,000/year

The final selection of the stratification variables was based upon the results of factor analysis which is discussed in the following section.

Food purchasing patterns are measured by: (a) total expenditures on all foods and beverages/year and (b) total annual expenditures on key food items. The list of key foods was compiled in consultation with CONADE's Nutrition Unit, which monitors market prices of these foods on a monthly basis to cost specific food baskets. The expenditure on individual food items had been recorded on a daily basis for a one week period. When the raw data set was

Table 3.2

List of key foods, and their corresponding codes

Urban Household Budget Survey, 1975/76.

Food Item:	Code	Percent of households reporting expenditures (n=9,518):
A. Cereals		
1. Rice	0102	84.6
2. Wheat flour	0109	31.4
3. Bread (wheat)	0117	78.7
B. Meats		
1. Beef (with bones)	0201	63.1
2. Beef (boneless)	0207	29.9
3. Pork chops	0215	8.0
4. Chicken	0223	25.1
C. Fish		
1. Sea-bass ("corvina")	0304	10.5
2. Tuna	0316	17.0
3. Sardines	0317	9.8
D. Oil and Fats		
1. Vegetable oil	0402	40.8
2. Vegetable lard	0405	43.0
E. Milk, Milk-Products and Eggs		
1. Eggs (chicken)	0503	60.6
2. Milk (fresh)	0505	70.6
3. Cheese (fresh)	0510	61.8
F. Vegetables		
1. Onion (white)	0608	45.7
2. Onion ("paiteña")	0609	68.7
3. Cabbage	0612	50.9
4. Corn (on the cob)	0616	27.4
5. String beans ("frejol tierno)	0620	28.4
6. Broad beans ("haba tierna)	0621	18.9
7. Lettuce	0624	37.1
8. Tomato	0632	73.1

Table <u>3.2</u> (Continued)

G. <u>Roots and Tubers</u>

1.	Potato ("chola")	0705	57.1
2.	Potato (white)	0706	15.3
3.	Yucca	0711	51.4
4.	Carrots	0713	56.1

H. <u>Legumes</u>

1.	Lentils	0806	26.2
2.	Black beans	0808	33.1

I. <u>Fruits</u>

1.	Avocado	0901	15.0
2.	Blackberry	0920	6.1
3.	Orange	0932	33.6
4.	Pineapple	0937	13.6
5.	Papaya	0938	13.5
6.	Banana	0940	35.0
7.	Plantain	0941	58.2

J. <u>Sugar, Salt and Condiments</u>

1.	Sugar (refined)	1107	83.9
2.	Salt	1121	58.9

K. <u>Beverages</u>

1.	Coffee (beans)	1202	5.8
2.	Coffee (ground)	1203	42.1
3.	Soft Drinks	1207	18.1

created, food expenditures had been converted to an annual total by multiplying the weekly totals by a factor of 52. The frequency with which each of the key food items was reported by the sample households is indicated in Table 3.2. Purchases of rice, bread, and sugar were reported by most households. Also frequently reported (more than 50%) were purchases of beef, eggs, milk, cheese, onions, tomatoes, cabbage, potatoes, yucca, carrots, plantain and salt.[1]

Health expenditures patterns are measured by: (a) total expenditures/ year on medical care and medicines, and (b) total annual expenditures on specific health care expenditure categories. These expenditures were recorded on a quarterly basis, and were later converted on an annual basis in the raw data set. A list of the individual health care categories, and the frequencies with which expenditures on each were reported by the sample households is presented in Table 3.3. Outpatient visits and purchases of medicines and over-the-counter drugs are the most significant categories.

3.2.2.   Rural Household Budget Survey, 1978/79.

The survey instrument which was applied in the Rural Household Budget Surveys consists of 20 different forms in addition to a general identification sheet. The data on each form has been recorded on a separate card type; thus, the raw data set contains 20 different card types. However, for purposes of this study, 14 card types contain data of interest. Of these, 12 have a varying number of records per case (household). The card types are described in Table 3.4. The data in the raw data set were transformed into variables, and were converted into system files which were merged into two master files ("PFAR1" and "PFAR2"), one for each survey. Both files contain 413 variables each, with one file containing 4,383 cases (round one) and the other 4,073 cases (round two).

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Table 3.3

List of Health expenditure categories, and frequency

of their reporting by sample households,

Urban Household Budget Survey, 1975/76

Code:	Health Expenditure Category:	Percent of households-reporting expenditure
3301	Outpatient visits	34.3
3302	Home visits by physician	4.7
3303	Dental care	9.6
3304	Laboratory analysis	3.8
3305	Eye care	1.4
3306	Home nursing	0.9
3307	Radiology exams	1.5
3308	Hospitalization (public institutions)	4.4
3309	Hospitalization (private institutions)	1.8
3310	Medicines/over-counter drugs	47.3
3311	X-rays	1.8
3312	Health insurance premiums	0.0 (n=3)
3313	Accident insurance premiums	0.1 (n=6)
3316	Other health expenses	1.2

Table 3.4
Organization of raw data set by different card types,
Rural Household Budget Surveys, 1978/79

Card Type: Data Description:

    10   Household:
                                    1. Housing characteristics

    20   Individual Household Member:
                                    1. Family position, sex, age, marital status
                                    2. Literary education

    50   Each Income-Receiving Member:
                                    1. Savings and outstanding debts
                                    2. Personal expenditures:
                                        a. code
                                        b. reference period
                                        c. unit of measurement
                                        d. quantity purchased
                                        e. unit price
                                        f. total value

    61   Household:
                                    1. Expenditure on foods and beverages
                                        (1 card per item):
                                        a. code
                                        b. reference period
                                        c. unit of measurement
                                        d. quantity purchased
                                        e. unit price
                                        f. total value

    62,63,64,65   Household:
                                    1. Expenditures on different goods and services
                                        (same format as 61)

    70   Agricultural Production Unit (UPA):
                                    1. Land area cultivated by tenure
                                    2. Land area cultivated by crop

    71   1. Total production, by crop
                                    2. Allocation of production -
                                        (sale, consumption, seed, etc.)
                                    3. Farmgate prices

    72,73   Income from animals and animal products
                                    forestry products, and other:
                                        a. quantities sold
                                        b. unit of measurement
                                        c. unit prices

    75,76   Production costs:
                                    1. Labor costs
                                    2. Other costs

The locational stratification variable is region (highland and coast). The same two demographic variables are included as described for the Urban Household Budget Survey. Because household size tended to be larger in rural areas, the cut-off points were slightly changed (4 or less persons/household, 5 or 6, 7 or 8, and 9 or more persons/household). The household life cycle stage variable was defined identically as for the Urban Household Budget Survey.

The socioeconomic variables for stratification were limited to housing characteristics, presence of appliances, access to water, electricity and hygienic facilities, and literacy status and formal education of the head of household. Further stratification was deemed necessary to distinguish between farming and non-farming households. In the former group, the amount of land under cultivation may be a good indicator of socioeconomic status. In addition, the extent to which the household depends on own production for its food supplies will have a significant impact on its food purchasing behavior. Thus, an additional variable which indicates the degree of market dependency will be required for stratification.

The food purchasing patterns were measured in the same way as for the urban survey. The list of key food items was adjusted in consultation with the staff of CONADE's Nutrition Unit in order to reflect more closely rural food purchasing patterns. Expenditures on food were recorded as weekly totals on the survey form. We transformed these weekly totals into six-months' totals by multiplying by a factor of 26. The list of 45 key food items, and the frequencies with which expenditures on these foods were reported by sample households, are presented in Table 3.5 for both rural surveys. There are

Table 3.5

List of key food items, and frequency of their

reporting by sample households,

Rural Household Budget Surveys I and II.

			Percent of households reporting expenditures	
			RHBS I:	RHBS II:
	A.	Cereals:		
1101		Rice	73.1	67.8
1102		Ground barley	9.1	8.9
1105		Noodles	77.4	76.6
1107		Wheat flour	36.4	34.1
1108		Main flour	3.2	3.8
1109		Barley flour	5.0	5.0
1110		Corn	7.2	3.8
1112		Corn (semi-dry)	2.2	1.6
1113		Bread (wheat, corn)	49.1	53.2
	B.	Legumes:		
1205		Lentils	16.2	14.6
1207		Dry beans ("porotos")	24.8	22.7
	C.	Vegetables:		
1302		Onion (white)	34.9	28.4
1303		Onion ("paiteña")	63.4	61.5
1305		Cabbage	24.1	21.9
1307		Corn (on the cob)	5.6	6.1
1308		String beans ("fréjol tierno")	7.9	6.4
1309		Broad beans ("haba tierna")	5.2	3.9
1310		Lettuce	13.9	13.3
1311		Tomato	47.7	47.5
	D.	Roots and Tubers:		
1402		"Melloco" (indigenous tuber)	2.3	3.8
1404		Potato	63.8	61.6
1406		Yucca	14.3	14.3
1407		Carrots	22.5	22.0
	E.	Fruits:		
1501		Avocado	6.4	6.6
1513		Blackberry	0.5	0.5
1515		Orange	9.8	20.6
1518		Pineapple	2.5	1.3
1519		Papaya	2.1	2.0
1521		Banana	16.2	17.9
1522		Plantain	25.8	30.2

Table 3.5 (continued)

F.   Meats and Fish:

1601	Beef	59.7	60.1
1603	Pork	0.7	6.8
1606	Other(prepared)	0.6	0.6
1607	Fresh fish	23.1	20.4
1608	Canned fish (tuna, sardines)	17.5	22.3

G.   Oil and Fats:

1701	Vegetable oil	23.8	22.8
1702	Lard (pork)	17.1	16.7
1703	Lard (vegetable)	58.4	61.7

H.   Milk, Milk Products and Eggs:

1801	Milk (fresh)	19.4	18.1
1803	Cheese	26.4	27.7
1805	Eggs (chicken)	14.8	14.1

I.   Sugar, Salt and Condiments:

1905	Sugar (refined)	73.3	71.9
1908	Sugar-unrefined ("panela")	25.8	24.9
1911	Salt	67.5	69.7

J.   Beverages:

2006	Soft drinks	7.5	12.3

generally no major differences between the two surveys in the reporting frequencies. Expenditures on rice, noodles, bread, onions, potatoes, beef, vegetable lard, sugar and salt were most frequently (more than 50 percent) reported.

Expenditures on health care were recorded on a quarterly basis on the survey form. The quarterly totals for each health care category were converted on a six-months' basis. The individual categories, and frequencies with which expenditures on each was reported by the sample households, are presented in Table 3.6. These categories differ slightly from those included in the urban survey. Expenditures on outpatient visits, and on medicines and over-counter drugs were the most frequently reported in both rural surveys, as was the case for the urban survey.

3.3. Statistical Techniques Employed

Standard statistical techniques were employed in the analysis presented in this report. These techniques are available in the SPSS subroutines. Simple frequency distributions or crosstabulations were run in order to: (a) produce descriptive statistics, (b) test for statistical associations between class variables, and (c) adjust cut-off points when converting continuous variables into class variables to ensure adequate cell frequencies.

Factor analysis was used in order to reduce the number of different socioeconomic status indicators to one "best" indicator. The procedures used and the results are described in greater detail in the next section.

Analysis of variance was employed in order to describe food purchasing and health care expenditure patterns (mean values) by stratified population groups. Regression analysis (ordinary least squares) was applied to estimate the income-expenditure relationships for different population strata.

Table 3.6

List of health expenditure categories, and frequency

of their reporting by sample households,

Rural Household Budget Surveys I and II

| Code: | Health Expenditure Category: | Percent of households reporting expenditure | |
		RHBS I:	RHBS II:
5101	Outpatient visits	37.0	37.3
5102	Dental visits	4.8	5.7
5103	Visits to ophthamologist	0.6	0.4
5104	Hospitalization	6.9	8.1
5105	Expenses- indigeneous medicine	4.7	5.1
5106	Over-the-counter drugs	53.1	70.4
5107	Medicines and vitamins	47.3	50.5
5108	Dentures and dental bridges	1.2	1.6
5109	Eyewear	0.3	0.3

4.   STRATIFICATION VARIABLES EXAMINED

Food expenditure patterns and food purchasing behavior depend on many factors. If we take the household as the unit of analysis, as is the case in the present study, then these variables can be distinguished as macro- and micro-level. Macro-level variables define the aggregate environment, external to the household unit over which it has no control. The variables most relevant to food expenditure patterns will include: food prices, physical availability of food items, food marketing structures. Access to different types of medical facilities, costs of different types of medical services, market prices of medicines and drugs, access to indigenous medical services are some macro-level variables which affect health care expenditure patterns.

Micro-level variables refer to demographic, cultural, social and economic attributes of the household unit. So, for instance, household expenditure patterns will depend on the sex and age composition of the household unit: individuals of different sex and ages have different needs and wants. Individual food preferences are socially and culturally determined. So is the household member who is assigned the role of acquiring food, or the decision to make use of traditional versus modern medical services. The economic variable thought to be of greatest importance for expenditure patterns is the level of household income. However, there are other dimensions of income which are also important for expenditure patterns: time pattern of income receipts, sources of income, and expectations about future income levels, for example.

It is also useful to point out that macro- and micro-level factors may interactively affect expenditure patterns. For example, the household's total income and market prices of goods and services determine the household's real

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purchasing power which in turn determines the household's total food budget. How the food budget is allocated among different food items and in what quantities, depends on the interaction of relative food prices and individual food preferences.

This is not the place to embark on an exhaustive review of the evidence relative to what factors affect household expenditure patterns, and in what way. This discussion merely serves to point to the need for multi-dimensional stratification of the population in order to measure representative expenditure patterns of population groups which are fairly homogeneous in micro-level attributes and macro-environments.

There are limitations to the stratification process. As is clear, the factors affecting expenditure patterns make up multi-component constructs which cannot directly be measured. Thus, we must select proxy variables which represent different dimensions of those constructs. The variables which can be selected are constrained by the available data. Of equal importance is the consideration as to what level the sample can be stratified. The objective is to define sub-samples which are homogeneous in as many aspects as is possible. But the sub-sample size must be statistically adequate to provide valid estimates of expenditure shares.

4.1. Urban Household Budget Survey, 1975/76

The location variables (Section 3.2.1) are employed as proxy variables to represent the macro-environments faced by the sample households. We are postulating that coastal and highland towns of different sizes at the time of the survey represented different macro-environments, in terms of food prices, food marketing and distribution, medical facilities, cost of medical care, etc.

It was decided to use as the primary demographic stratification variable the household's life cycle stage (LFSTAGE), because of evidence in the literature that food expenditure patterns change as households move through the life cycle (8,9,10). The expenditure variables are also adjusted for household size when appropriate, in order to take account of this important demographic variable.

Socio-Economic Status (SES)

One variable was selected as a proxy for the construct SES from a list which was described previously. One variable was a priori eliminated; the coding of the occupational group of the head of household contained a group which could not be classified: unemployed, in the Armed Forces, etc. If the occupation variable had· been included, the total sample would have been reduced by 1,041 cases (10.9%).

A factor analysis[2] was performed for the following purposes: (a) to investigate which of the remaining variables represent the same dimensions of the SES construct, and (b) to determine which variable(s) are good substitutes for household income to stratify the population for SES.

Valid estimates of income are often difficult to obtain because of deliberate under- or over-reporting. To construct an income variable is cumbersome and requires many questions during the interview, especially when several household members receive income in one form or another. Thus, there is a need to find stratification variables other than income to define the household's SES.

The remaining six SES variables[3] were entered into a factor analysis in a first round. It became clear from the results that housing density (HOUSDEN) and the presence/absence of water, electricity and toilet (FACILITI) are variables which either are poor proxies for SES, or represent another

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dimension of SES than the other variables. With a minimum Eigenvalue specified at one, one factor was generated with these two variables having relatively low factor loadings. When the minimum Eigenvalue was reduced to 0.7, to increase the percent of variance explained, three factors were generated, with HOUSDEN entering the second factor with a high factor loading (0.96) and FACILITI the third factor. Thus, it was decided to drop these two variables from consideration.

The factor analysis was then repeated with the four remaining variables. This was done for the sample as a whole, as well as by region and city size. The results are presented in Table 4.1. With the four variables, one factor was generated: INCOME entered with the highest factor loading (0.86), and HOUSQUAL with the lowest (0.75). This factor explains 66 percent of the total variance. It is clear that these four variables represent the same dimension of the SES construct in the whole sample.[4] Across regions and city size, HOUSQUAL demonstrates the least stability in factor loadings, and APLIANCE the highest degree of stability. HOUSQUAL consistently enters the factor with lowest factor loading, except for the sub-sample from Guayaquil. Except for the sub-samples from small highland towns and from Guayaquil, the factor loading of APLIANCE is the closest to that of INCOME in the other four sub-samples. At this point, we should like to nominate APLIANCE as the primary SES stratification variable. EDUC should perform almost equally well, however.

The remaining concern deals with the cell frequencies after several levels of stratification, with the location, demographic and SES variables as they now stand. In Table A.4.1 are presented sub-sample sizes for a three-level stratification procedure: by REGION, CITY SIZE and APLIANCE, or LFSTAGE. In only one cell (Quito households with zero appliances) falls the

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TABLE 4.1

Results of the Factor Analysis of Selected SES Variables, for the Whole Sample, and by Region and City Size, Urban Household Budget Survey 1975/76

H I G H L A N D S

SES Variables	Whole Sample		Less than 40,000 Inhabitants		More than 40,000 Inhabitants		Quito	
	Factor Loading	Commun-ality	Factor Loading	Commun-ality	Factor Loading	Commun-ality	Factor Loading	Commun-ality
EDUC	.79	.62	.74	.55	.75	.57	.80	.65
APLIANCE	.84	.71	.83	.69	.83	.68	.86	.74
INCOME	.86	.74	.78	.61	.85	.73	.87	.76
HOUSQUAL	.75	.57	.65	.43	.62	.38	.74	.55
Eigenvalue	2.64		2.28		2.36		2.70	
% Variance Explained	65.9		57.1		59.1		67.6	

C O A S T

SES Variables	Less than 40,000 Inhabitants		More than 40,000 Inhabitants		Guayaquil	
	Factor Loading	Commun-ality	Factor Loading	Commun-ality	Factor Loading	Commun-ality
EDUC	.73	.53	.76	.57	.80	.64
APLIANCE	.82	.68	.81	.65	.80	.65
INCOME	.82	.67	.84	.71	.88	.77
HOUSQUAL	.73	.54	.73	.53	.83	.69
Eigenvalue	2.41		2.46		2.75	
% Variance Explained	60.3		61.5		68.7	

frequency of households below one hundred.[5] We also investigated whether a four-level stratification is feasible; however, a large number of cells demonstrated too low a frequency. Thus, a three-level stratification procedure is the most the total sample size will support, unless the stratification variables are further adjusted by combining different classes. This will increase the sub-sample sizes, but results in a loss of homogeneity within the sub-samples.

4.2. Rural Household Budget Surveys, 1978/79

The key location variable is region (coast, highlands). The nex level of stratification is the distinction between farming--and non-farming households. The latter group was defined as households which reported not having any land under cultivation at the time of the survey. From Table A.4.2. it is clear that in both surveys and in both regions, the majority of the sample households engaged in farming.

The primary demographic stratification variable employed is the household's life cycle stage (LFSTAGE), as defined for the urban survey (see section 4.1). This variable may be important not only for expenditure patterns, but may also have important implications for levels of food production for self-consumption, thus, further affecting food expenditure patterns. As in the analysis of the urban survey, the expenditure variables are adjusted for household size.

Socio-Economic Status (SES)

Several variables were considered in order to select one proxy variable for the construct SES. One set of variables were eliminated early on from further consideration when it became clear that rural housing characteristics varied significantly between coast and highlands in terms of: type of house,

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and construction materials of roofs and floors. This was interpreted to mean that an uniform scale based upon one or more of these housing characteristics would provide a very different SES classification in each region. This was also borne out by the results of a factor analysis which demonstrated a low degree of stability of factor loadings across the two regions of different housing characteristics.

The following variables were included in a factor analysis in order to select the "best" SES proxy:

(a) formal schooling of the head of household (EDUC):

    0:   none

    1:   1-3 grades primary school

    2:   4th grade of primary school or higher.

(b) number of household appliances present (APLIANCE):

    1: 0 or 1; 2: 2 or 3: 3+.

(c) access to different facilities: potable water, electricity and toilet (FACILITI):

    0: 0; 1: 1; 2: 2 or 3.

(d) Cooking fuel used (COOKFUEL):

    1:   wood/charcoal

    2:   electricity, gasoline, and/or kerex.

For farming households, an additional variable was included: land area under cultivation (HECTA):

    1:   less than 1 ha.

    2:   1 - less than 2 ha.

    3:   2 - less than 5 ha.

    4:   5 - less than 10 ha.

    5:   10 ha. or more.

The results of the factor analysis for farming and non-farming households are presented in Tables 4.2 and 4.3. In all cases was the minimum eigenvalue specified at one, and the matrices were rotated by the varimax technique (14). For all farming households, as well as those in the highlands, two factors were generated, indicating that land area under cultivation (HECTA) represents a different dimension of SES than the remaining four variables. This is to a lesser degree true for coastal farming households[6]. The variables other than HECTA demonstrate a certain degree of stability of factor loadings in the first factor across different groups, with FACILITI entering with the highest factor loading. In the sample as a whole, and among highland farming households, the factors explain approximately 60 percent of the total variance. It was decided to select HECTA as the primary stratification variable as representing a more relevant dimension of SES among farming households.

All four variables appear to represent the same dimension of SES in the sample of non-farming households. In this sample as well as in the sub-sample of coastal non-farming households, FACILITI enters the factors with the highest factor loading (.78 and .81, respectively). APLIANCE demonstrates the highest factor loading (.82) in the sub-sample of highland non-farming households. In each case, the generated factor explains approximately half of the total variance. We selected FACILITI as the primary SES stratification variable for non-farming households. APLIANCE should perform almost equally well though.

We lastly present the cell frequencies in different stratification schemes, for both surveys (Tables A.4.3, A.4.4 and A.4.5). In the sub-sample of farming households, there was a tendency towards larger land areas being cultivated among coastal households ($\chi^2 = 361.3$ (p < .01); Kendall tau:

TABLE 4.2
Results of the Factor Analysis of Selected SES Variables, for the Whole Sample of Farming Households, and by Region Rural Household Budget Survey I

SES Variables	ALL			HIGHLANDS			COAST	
	Factor Loadings		Commu- nality	Factor Loadings		Commu- nality	Factor Loading	Commu- nality
	Factor 1	Factor 2		Factor 1	Factor 2			
HECTA	-.01	.92	.85	-.02	.92	.84	.38	.15
EDUC	.58	.19	.37	.61	.33	.49	.53	.28
APLIANCE	.61	.45	.57	.74	.28	.63	.61	.37
FACILITI	.76	-.29	.66	.74	-.31	.65	.66	.44
COOKFUEL	.64	.02	.41	.62	-.14	.41	.59	.35
Eigenvalue	1.74	1.12		1.88	1.14		1.58	
% Variance Explained	34.9	22.5		37.5	22.7		31.7	

TABLE 4.3
Results of the Factor Analysis of Selected SES Variables, for the
Whole Sample of Non-Farming Households, and by Region
Rural Household Budget Survey I

SES Variables	ALL		HIGHLANDS		COAST	
	Factor Loading	Commu- nality	Factor Loading	Commu- nality	Factor Loading	Commu- nality
APLIANCE	.72	.52	.82	.68	.70	.49
FACILITI	.78	.61	.74	.55	.81	.65
COOKFUEL	.66	.43	.67	.45	.63	.40
EDUC	.70	.48	.69	.48	.68	.47
Eigenvalue	2.05		2.16		2.01	
% Variance Explained	51.2		54.1		50.3	

.36(p < .01) for the first survey). Consequently, the frequencies of coastal farming households which cultivated less than 1 ha. are relatively low in both surveys.

In the sub-sample of non-farming households, stratified by region and FACILITI, none of the cell frequencies falls below 100 in the first survey; while in the second survey, several cells demonstrate a frequency below 100. When the total samples are stratified by region, farming or non-farming, and life cycle stage, several cell frequencies become rather low, especially among non-farming households. In future exercises with relatively low samples, a re-definition of the life cycle stage variable which results in fewer classes may be considered.

5. FOOD EXPENDITURE PATTERNS IN URBAN AND RURAL ECUADOR.

Food expenditure patterns are presented in this section in several forms: (a) per capita food expenditures, (b) total food expenditures, and expenditures on 41 key foods, as percent of total household expenditures, (c) expenditures on selected food items as percent of total food expenditures, and (d) expenditure elasticities of total food expenditures, expenditures on 41 key foods, and of expenditures of selected food items. Because both the rural and urban surveys are rather dated, per capita expenditures are not too meaningful, except to serve as baseline data against which the results of any future surveys can be measured. In computing the average expenditure shares, it was assumed that households which did not report any expenditures on a particular food, had indeed not purchased any of the food. The data did not allow us to distinguish between zero expenditure and missing data. Consequently, average expenditure shares may be underestimated somewhat. In computing the marginal expenditure shares or expenditure elasticities, only households with positive expenditures are included, of course, since logarithmic transformations are only possible of positive values. This means that if non-reporting of expenditures meant indeed zero expenditures, the expenditure elasticities may have a downward bias. If non-reported expenditures indeed meant missing data, the bias can not a priori be determined. Average expenditure shares indicate how important a particular expenditure is in overall expenditures at a point in time. Marginal expenditure shares provide estimates of how expenditures on particular foods, or group of foods may change in response to changes in household income. It should be remembered that extrapolations to inter-temporal behavior from results obtained with cross-sectional data have limited validity. Thus the results presented should be interpreted as

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estimates of magnitudes rather than precise predictors of changes in expenditure behavior. Lastly, we need to point out that we have selected total household expenditures as a proxy variable for household income. The former is thought to reflect more adequately the level of permanent household income, and thus to be a more valid predictor of household food expenditures. Short-run, transitory changes in total household income are not likely to impact significantly on household food budgets.

5.1. Urban food expenditure patterns.

Median household food expenditures amounted to S/.25,075 per annum in the urban sample. On the average, urban households spent 45 percent of total household expenditures on food. Per capita food expenditures and mean percent of total food expenditures spent on specific food items are presented in Table 5.1. for the urban sample stratified by region and city size. The specific food items which are included were selected on the basis of high reporting frequency (see Table 3.3). Per capita food expenditures increased with city size, while food expenditures as percent of total expenditures decreased in both highland and coastal urban populations. Per capita food expenditures were also higher among households in Quito than in Guayaquil. A similar pattern emerged for expenditures on the 41 key foods as a group. The following reasons are likely to account for this pattern:

(a) generally higher income levels and smaller household size in larger cities;

(b) higher mean food prices, reflecting greater variety in quality and higher marketing and distribution costs.

Thus, at the same income level, households may not necessarily consume more foods in larger cities than in small ones.

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TABLE 5.1

Food expenditure patterns of urban populations stratified by region and city size
(per capita expenditures and average expenditure shares)
X(SE)

Food Item Category	HIGHLANDS						COAST					
	LT 40,000		GT 40,000		QUITO		LT 40,000		GT 40,000		GUAYAQUIL	
	A S/.	B %	A S/.	B %	A S/.	B %	A S/.	B %	A S/.	B %	A S/.	B %
All	5554 (110)	52.1[a] (0.5)	6331 (107)	42.1[a] (0.4)	9381 (269)	37.8[a] (0.5)	5129 (115)	53.3[a] (0.4)	6205 (105)	45.4[a] (0.3)	8113 (202)	39.6[a] (0.4)
41 Key foods	2947 (64)	28.6[a] (0.4)	3397 (60)	24.1[a] (0.3)	5156 (116)	23.4[a] (0.4)	3188 (57)	37.5[a] (0.4)	3542 (57)	29.5[a] (0.3)	4559 (97)	25.0[a] (0.4)
Rice	297 (10)	6.1 (0.2)	432 (19)	7.6 (0.1)	384 (13)	5.3 (0.1)	645 (12)	15.8 (0.3)	567 (9)	11.9 (0.2)	567 (14)	9.5 (0.2)
Bread	277 (9)	5.7 (0.1)	392 (7)	7.3 (0.1)	468 (12)	6.0 (0.1)	157 (4)	3.4 (0.1)	222 (5)	4.2 (0.1)	241 (7)	3.9 (0.1)
Beef (w/bones)	248 (13)	4.7 (0.2)	210 (7)	3.9 (0.1)	415 (16)	5.1 (0.2)	589 (16)	13.3 (0.3)	250 (9)	4.7 (0.1)	455 (19)	6.4 (0.2)
Vegetable lard	51 (3)	1.2 (0.1)	54 (3)	1.2 (0.1)	89 (5)	1.3 (0.1)	205 (6)	4.8 (0.1)	137 (4)	3.0 (0.1)	33 (2)	0.6 (0.0)
Eggs	190 (8)	2.8 (0.1)	195 (6)	2.7 (0.1)	306 (10)	3.2 (0.1)	79 (5)	1.3 (0.1)	143 (5)	2.2 (0.1)	143 (6)	1.7 (0.1)
Milk	371 (12)	6.7 (0.2)	440 (10)	7.6 (0.1)	793 (19)	9.2 (0.2)	188 (9)	3.2 (0.1)	272 (8)	4.0 (0.1)	561 (14)	7.6 (0.2)
Cheese	130 (7)	2.0 (0.1)	113 (4)	1.6 (0.1)	188 (9)	1.8 (0.1)	98 (4)	2.1 (0.1)	152 (4)	2.4 (0.1)	168 (7)	1.9 (0.1)
Onions	22 (1)	0.4 (0.0)	34 (1)	0.6 (0.0)	52 (2)	0.6 (0.0)	68 (2)	1.5 (0.0)	63 (1)	1.2 (0.0)	91 (3)	1.2 (0.0)
Tomatoes	63 (3)	1.0 (0.0)	66 (2)	1.1 (0.0)	107 (3)	1.3 (0.0)	80 (2)	1.7 (0.0)	75 (2)	1.3 (0.0)	115 (5)	1.6 (0.1)
Potatoes	226 (12)	4.3 (0.2)	150 (8)	2.6 (0.1)	302 (12)	4.1 (0.2)	84 (2)	1.9 (0.1)	67 (2)	1.3 (0.0)	150 (5)	2.2 (0.1)
Plantain	34 (2)	0.7 (0.0)	32 (1)	0.6 (0.0)	36 (2)	0.4 (0.0)	62 (2)	1.6 (0.1)	111 (3)	2.4 (0.1)	42 (2)	0.7 (0.0)
Sugar	173 (6)	3.6 (0.1)	197 (8)	3.4 (0.1)	199 (8)	2.6 (0.1)	139 (3)	3.2 (0.1)	163 (3)	3.2 (0.1)	156 (4)	2.3 (0.1)
Coffee (ground)	84 (4)	1.8 (0.1)	70 (3)	1.3 (0.1)	71 (4)	1.0 (0.1)	52 (3)	1.2 (0.1)	42 (2)	1.0 (0.0)	54 (3)	1.0 (0.0)

A: per capita expenditure/year.
B: expenditure as percent of total food expenditure.

[a] As percent of total expenditures.

The average expenditure share of food did not differ significantly between highland and coastal cities of similar size. The gap in average expenditure shares of the 41 key foods between highland and coastal cities is highest between cities with less than 40,000 population, and least between Quito and Guayaquil.

Individual food items demonstrated different expenditure patterns. Per capita annual expenditures on bread, vegetable lard, eggs, milk, onions, tomatoes, and sugar tended to increase with city size in highland populations, though mostly the difference is between Quito and other highland cities . Mean per capita expenditures on rice were higher in highland cities > 40,000 population than in smaller cities or in Quito. For the remaining food items (beef, cheese, potatoes and ground coffee) mean per capita expenditures were higher in coastal cities < 40,000 population than in larger cities.

Expenditures on none of the selected food items represented on the average more than 10 percent of the households' food budgets among households in highland cities of various size. Milk, rice, bread and beef showed the highest average food budget shares reflecting high reported frequency of expenditure as well as differences in relative unit prices and quantities purchased. A low average food budget share does not necessarily mean that the food item is quantitatively unimportant in the daily diet.

Per capita expenditures on bread, milk, and cheese tended to increase with city size in coastal populations, while mean per capita expenditures on rice, beef, vegetable lard, potatoes, onions, tomatoes and ground coffee were lower in coastal cities with population > 40,000 than in smaller cities. The opposite pattern was seen for mean per capita expenditures on eggs, plantain, and sugar. Per capita expenditures on vegetable lard and plantain in the population of Guayaquil was significantly lower than in the populations

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of other coastal cities. Rice, beef, bread and milk showed the highest average food budget shares for coastal households.

Comparing coastal and highland populations in cities of similar size, the following observations are possible:

(a) coastal households in smaller cities (< 40,000 population) spent a greater share of their food budgets on rice, beef, vegetable lard, onions, tomatoes and plantain than highland households which in turn spent a greater share on bread, eggs, milk and potatoes;

(b) similar differences in food purchasing patterns existed between households in coastal and highland cities with population > 40,000, though the differences were less pronounced than among smaller cities;

(c) households residing in Quito generally spent a greater share of their food budgets on bread, vegetable lard, eggs, mild and potatoes, but a smaller share on rice, beef and onions, than households in Guayaquil.

Food expenditure pattern by region, city size and socioeconomic status (SES).

As was explained in the previous section, the primary stratification variable selected for SES is APLIANCE (number of household appliances present). We would expect that the average expenditure share on food declines with higher SES levels (Engel's Law). The average food budget share of certain foods, particularly staple foods, would be expected to follow the same pattern, while that of other foods may well demonstrate a pattern of constant or increasing food budget shares with higher SES levels. For example, foods with high social prestige value or of which there exist many different varieties, and quality levels (and thus price levels), may exhibit

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increasing food budget shares as households substitute higher priced varieties with income increases.

The average expenditures shares for food, and the average food budget shares for selected food items are presented in Tables 5.2 and 5.3 for urban populations stratified by region, city size and SES. The following observations can be made for highland households (Table 5.2):

(a) The average expenditure share for food declined with increasing SES levels among highland households in small cities, large cities and in Quito.

(b) The average expenditure share for 41 key foods also declined with increasing SES levels among households residing in cities of different sizes, though much of the decline was among the higher SES households.

(c) In small cities, the average food budget share for rice tended to decrease, and for potatoes tended to increase, with higher SES of households. The average food budget shares of bread, milk, eggs, beef, cheese all showed a tendency to increase with SES, while those of sugar and ground coffee tended to decrease with SES.

(d) The average food budget shares for rice, vegetable lard, sugar and ground coffee decreased, and for eggs, milk, cheese and tomatoes increased, with higher SES levels among household in large highland cities.

(c) The average food budget shares for rice and bread remained rather constant with SES, and only dropped among the higher SES class of the households residing in Quito. The food budget shares for eggs, milk and cheese increased, and those for potatoes, sugar and ground coffee declined, with the SES of these households.

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TABLE 5.2

Food expenditure patterns of highland urban populations stratified by city size and socioeconomic status (average expenditure shares)

X (SE)

Food Item Category	LT 40,000 APLIANCE				GT 40,000 APLIANCE				QUITO APLIANCE			
	0	1	2	3+	0	1	2	3+	0	1	2	3+
All[a]	59.7 (1.0)	53.5 (0.7)	47.5 (0.9)	39.4 (0.2)	52.7 (0.9)	46.7 (0.7)	41.3 (0.5)	32.1 (0.6)	53.3 (2.1)	50.0 (1.0)	39.9 (0.8)	29.3 (0.5)
41 Key foods[a]	30.7 (0.8)	28.7 (0.6)	28.3 (0.8)	23.8 (1.0)	27.9 (0.9)	26.4 (0.6)	24.9 (0.4)	18.5 (0.4)	31.6 (2.6)	31.9 (0.9)	25.9 (0.6)	17.1 (0.4)
Rice[b]	6.5 (0.3)	6.1 (0.2)	6.0 (0.3)	5.2 (0.4)	9.0 (0.4)	8.4 (0.2)	7.7 (0.2)	5.8 (0.2)	6.0 (0.7)	6.9 (0.3)	6.4 (0.6)	3.9 (0.1)
Bread[b]	5.5 (0.3)	5.0 (0.2)	6.5 (0.3)	6.8 (0.4)	7.3 (0.4)	7.6 (0.3)	7.4 (0.2)	6.9 (0.2)	6.3 (0.7)	6.7 (0.3)	6.3 (0.3)	5.5 (0.1)
Beef (w/bones)[b]	3.0 (0.4)	4.8 (0.3)	6.0 (0.5)	5.0 (0.6)	4.2 (0.3)	3.9 (0.2)	3.8 (0.2)	3.7 (0.2)	4.3 (0.9)	5.8 (0.4)	5.4 (0.3)	4.7 (0.2)
Vegetable lard[b]	1.6 (0.2)	1.2 (0.1)	0.9 (0.1)	0.9 (0.2)	1.5 (0.2)	1.6 (0.1)	1.1 (0.1)	0.6 (0.1)	1.9 (0.5)	2.0 (0.2)	1.6 (0.2)	0.8 (0.1)
Eggs[b]	1.7 (0.2)	2.6 (0.1)	4.0 (0.2)	3.9 (0.3)	1.8 (0.2)	2.0 (0.1)	3.1 (0.1)	3.6 (0.1)	2.0 (0.5)	2.5 (0.2)	3.2 (0.2)	3.7 (0.1)
Milk[b]	4.7 (0.4)	6.5 (0.3)	8.4 (0.3)	8.5 (0.5)	6.1 (0.5)	6.9 (0.3)	8.2 (0.2)	8.4 (0.2)	7.5 (0.1)	8.2 (0.4)	9.2 (0.3)	9.8 (0.3)
Cheese[b]	1.4 (0.2)	2.0 (0.1)	2.4 (0.2)	2.4 (0.2)	1.3 (0.1)	1.3 (0.1)	1.8 (0.1)	2.0 (0.2)	1.0 (0.3)	1.2 (0.1)	1.5 (0.1)	2.3 (0.1)
Onions[b]	0.3 (0.0)	0.3 (0.0)	0.4 (0.0)	0.5 (0.0)	0.5 (0.0)	0.7 (0.0)	0.7 (0.0)	0.5 (0.0)	0.6 (0.1)	0.6 (0.0)	0.7 (0.0)	0.6 (0.0)
Tomatoes[b]	0.8 (0.1)	0.9 (0.1)	1.4 (0.1)	1.3 (0.1)	0.7 (0.1)	1.1 (0.1)	1.2 (0.0)	1.2 (0.0)	1.4 (0.2)	1.2 (0.1)	1.4 (0.1)	1.2 (0.0)
Potatoes[b]	3.5 (0.5)	3.9 (0.3)	5.2 (0.4)	6.3 (0.7)	2.8 (0.3)	2.7 (0.2)	2.8 (0.2)	2.1 (0.2)	4.7 (0.9)	5.5 (0.4)	4.9 (0.3)	3.0 (0.2)
Plantain[b]	0.5 (0.1)	0.8 (0.1)	0.7 (0.1)	0.6 (0.1)	0.7 (0.1)	0.7 (0.1)	0.7 (0.1)	0.5 (0.0)	0.3 (0.1)	0.5 (0.1)	0.6 (0.1)	0.4 (0.0)
Sugar[b]	4.5 (0.2)	3.5 (0.2)	3.0 (0.1)	3.3 (0.3)	3.9 (0.2)	3.9 (0.1)	3.4 (0.1)	2.8 (0.1)	3.7 (0.5)	3.4 (0.1)	2.7 (0.1)	2.0 (0.1)
Coffee (ground)[b]	2.2 (0.2)	2.0 (0.1)	1.4 (0.1)	1.2 (0.2)	1.5 (0.1)	1.5 (0.1)	1.3 (0.1)	1.0 (0.1)	1.2 (0.3)	1.6 (0.2)	1.1 (0.1)	0.7 (0.1)

[a] As percent of total expenditures.

[b] As percent of total food expenditures.

For coastal households, the following can be noted from Table 5.3:

(a) The average expenditure shares for food, and for the group of key foods, declined with higher SES levels of households residing in small and large cities and in Guayaquil.

(b) The food budget shares for eggs and milk increased with SES, and for rice, beef, vegetable lard, potatoes, plantain, sugar and ground coffee decreases with SES, among households residing in small cities.

(c) Among households residing in large cities, the average food budget shares for rice, vegetable lard, plantain, sugar and ground coffee showed a clear pattern of declining with SES, while the shares for eggs and milk increased.

(d) The pattern of average food budget shares among households of different SES levels residing in Guayaquil resembled that of households in large cities except that the share for cheese demonstrated a stronger increasing trend, and that for potatoes more of a declining trend, with higher SES levels.

Among urban households, independently of where they reside, total food budgets represent a smaller share of total household expenditures with higher SES levels. Though total expenditures on the 41 key foods represented a smaller proportion of total food expenditures among highland households, in both regional sub-samples this proportion stayed fairly constant across SES levels, especially among households residing in Quito and Guayaquil. This suggests shifts in expenditures among key foods in the form of substitution both between-and within foods. Expenditures on milk, cheese and eggs command greater shares of food budgets at higher SES levels of highland households independently of the size of the city they reside in. Expenditures

TABLE 5.3

Food expenditure patterns of coastal urban populations stratified by city size and socioeconomic status (average expenditure shares)

$\bar{X}$ (SE)

Food Item Category	LT 40,000 APLIANCE				GT 40,000 APLIANCE				GUAYAQUIL APLIANCE			
	0	1	2	3+	0	1	2	3+	0	1	2	3+
All[a]	58.5 (0.6)	55.7 (0.7)	45.5 (1.2)	40.1 (1.1)	52.7 (0.7)	48.8 (0.5)	41.4 (0.7)	38.0 (0.6)	54.8 (1.4)	49.4 (0.9)	43.1 (0.9)	32.4 (0.5)
41 Key foods[a]	41.7 (0.6)	40.2 (0.8)	29.9 (1.0)	26.8 (1.0)	34.1 (0.8)	32.1 (0.5)	27.0 (0.6)	24.0 (0.5)	34.6 (1.5)	31.1 (0.9)	27.9 (0.9)	20.2 (0.4)
Rice[b]	18.4 (0.5)	16.6 (0.5)	12.0 (0.6)	10.0 (0.5)	14.5 (0.4)	13.3 (0.3)	10.5 (0.3)	9.0 (0.2)	14.4 (0.8)	12.6 (0.5)	11.7 (0.5)	6.9 (0.2)
Bread[b]	3.1 (0.2)	3.9 (0.2)	3.7 (0.2)	3.3 (0.2)	3.8 (0.2)	4.2 (0.1)	4.8 (0.3)	4.0 (0.1)	4.4 (0.6)	4.3 (0.2)	4.1 (0.3)	3.6 (0.1)
Beef (w/bones)[b]	13.7 (0.4)	14.2 (0.6)	12.2 (0.9)	11.3 (0.8)	4.5 (0.3)	5.1 (0.2)	5.0 (0.4)	4.0 (0.2)	6.5 (0.8)	6.6 (0.5)	6.3 (0.5)	6.3 (0.3)
Vegetable lard[b]	5.9 (0.2)	4.9 (0.2)	3.7 (0.2)	2.7 (0.2)	4.2 (0.2)	3.5 (0.1)	2.6 (0.1)	1.7 (0.1)	0.9 (0.2)	0.8 (0.1)	0.5 (0.1)	0.5 (0.1)
Eggs[b]	0.9 (0.1)	1.3 (0.1)	1.8 (0.2)	2.2 (0.2)	1.8 (0.1)	2.0 (0.1)	2.2 (0.1)	2.7 (0.1)	1.2 (0.2)	1.2 (0.1)	1.5 (0.1)	2.0 (0.1)
Milk[b]	2.1 (0.2)	3.0 (0.3)	4.2 (0.4)	6.2 (0.4)	2.0 (0.2)	3.3 (0.2)	4.8 (0.3)	6.1 (0.2)	5.4 (0.6)	6.0 (0.3)	6.8 (0.4)	8.7 (0.2)
Cheese[b]	2.2 (0.1)	2.1 (0.1)	2.0 (0.2)	2.1 (0.2)	2.2 (0.1)	2.4 (0.1)	2.5 (0.1)	2.6 (0.1)	1.4 (0.2)	1.4 (0.1)	1.7 (0.1)	2.3 (0.1)
Onions[b]	1.6 (0.1)	1.6 (0.1)	1.4 (0.1)	1.2 (0.1)	1.2 (0.0)	1.2 (0.1)	1.2 (0.0)	1.0 (0.0)	1.4 (0.1)	1.3 (0.1)	1.3 (0.1)	1.2 (0.0)
Tomatoes[b]	1.7 (0.1)	1.8 (0.1)	1.6 (0.1)	1.4 (0.1)	1.2 (0.1)	1.4 (0.1)	1.4 (0.1)	1.3 (0.0)	1.8 (0.1)	1.8 (0.1)	1.7 (0.1)	1.5 (0.1)
Potatoes[b]	2.1 (0.1)	1.9 (0.1)	1.7 (0.1)	1.3 (0.1)	1.5 (0.1)	1.3 (0.1)	1.2 (0.1)	1.1 (0.1)	3.2 (0.3)	2.3 (0.1)	2.1 (0.1)	2.0 (0.1)
Plantain[b]	1.9 (0.1)	1.7 (0.1)	1.0 (0.1)	0.8 (0.1)	3.3 (0.2)	2.8 (0.1)	2.0 (0.1)	1.6 (0.1)	0.9 (0.1)	0.9 (0.1)	0.7 (0.1)	0.6 (0.1)
Sugar[b]	3.4 (0.1)	3.3 (0.1)	2.8 (0.1)	2.5 (0.1)	3.6 (0.1)	3.5 (0.1)	3.0 (0.1)	2.5 (0.1)	2.8 (0.2)	2.8 (0.1)	2.4 (0.1)	2.0 (0.1)
Coffee (ground)[b]	1.5 (0.1)	1.3 (0.1)	0.8 (0.1)	0.5 (0.1)	1.3 (0.1)	1.2 (0.1)	0.7 (0.1)	0.4 (0.1)	1.5 (0.2)	1.4 (0.1)	1.0 (0.1)	0.6 (0.1)

[a] As percent of total expenditures.

[b] As percent of total food expenditures.

on sugar and ground coffee represent decreasing shares of food budgets at higher SES levels, as well as expenditures on rice among households in large and small highland cities, but not in Quito for which the food budget shares of rice and bread remain constant with SES levels.

Expenditures on milk and eggs represent also higher shares of food budgets across higher SES levels of coastal households in all urban areas, while the food budget shares of rice, vegetable lard, potatoes, plantain, sugar and ground coffee declines. As among highland households, the expenditures on onions and tomatoes remain a constant proportion of the food budget at all SES levels.

Food expenditure pattern by region, city size and household life cycle stage.

In order to stratify population groups by household composition, the concept of life cycle stage is used. Household composition can affect food purchasing behavior because it reflects: (a) differences in dietary needs and in food preferences, (b) differences in time allocated for food shopping and preparation, and (c) differences in patterns of eating away from home (8). During the early stages of the household life cycle, household size increases rapidly while household income grows more slowly, putting relatively greater stress on adaptive behavior by the food purchaser in the form of greater efficiency in food purchasing (9). Also, during the early stages of the life cycle the household is still establishing dietary practices and food and menu routines, and is much more susceptible to outside influences such as advertisements, information from friends and relatives (10). In the U.S. it has been shown that health concerns, food costs and nuclear family members exert a constant influence on food decisions over the household life cycle (10). Generally we would expect that as households move through the life

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cycle, a pattern of initially increasing expenditure shares of food, which peak and thereafter decline in the later stages. This pattern has been shown in the U.S. (9). A priori we would also expect a similar pattern for staple foods.

Average expenditures shares of food, and average food budget shares of selected food items, are presented in Tables A.5.1 and A.5.2. for urban populations stratified by region, city size and household life cycle stage (LFSTAGE; see Section 4).

Among households residing in both highland and coastal cities of different sizes, the average expenditure shares of food across life cycle stages generally conformed to the expected pattern. In highland cities the peak tended to be at stage 4 (head of household > 40 years old; at least one child < 6 years present), while the peak in small coastal cities was also at stage 4, and in bigger coastal cities at stages 3 or 4. The average expenditures shares of the key foods followed the same pattern of those of all foods; the same is true of the pattern of average food budget shares of the key foods group across life cycle stages.

In highland cities, the pattern of average food budget shares of the following food items showed the inverted U-shape: rice, bread, beef and potatoes. These patterns were less uniform between coastal cities of different sizes with the exception of rice. The inverted U-shape pattern was also observed for vegetable lard among households in small and big cities, for bread in big cities and in Guayaquil, for plantain in big cities and for beef in Guayaquil. Furthermore, the average food budget shares of milk tended to peak at stage 2 for households residing in coastal cities of all sizes, and in big highland cities and in Quito. The average food budget shares of the

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remaining food items listed demonstrated a fairly constant pattern across life cycle stages among both coastal and highland urban households.

Food expenditure functions of urban households.

In order to estimate the expenditure elasticities of all foods, the key foods group and of selected food items, several functional forms of the basic demand equation were considered. There is no general agreement as to the "best" functional form, but the double-log and semi-log model specifications are the most often used (3,15). The double log function assumes a constant proportional effect of total household expenditures on the expenditures of food over the range of household expenditures which may be difficult to maintain if the range is wide. For certain food· commodities, particularly staple foods, a double-log-inverse function may be more appropriate, again when the range of household income is wide. The semi-log function does not maintain a constant proportional income effect; it has been shown to perform as well or better than the double-log function for food commodities which are not luxuries (3). The double-log function should perform well for food commodities considered to be luxuries.

In Table A.5.3. are presented the results of three functional forms of the expenditure functions for the whole urban sample. The basic model is:

$$E_i = f(E_t, H)$$

where: E_i = expenditure on all foods, or on the ith food commodity

E_t = total household expenditures (as proxy for total household income).

H = number of persons/household.

The presented elasticity coefficients of the semi-log model are the estimated regression coefficients evaluated at mean food expenditure levels; those of the

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double log-inverse model are the estimated regression coefficients evaluated at mean total expenditure levels. Comparing the results it can be seen that the estimated expenditure elasticities (at mean food expenditure levels) of the semi-log model are consistently lower, except for beef, vegetable lard, onions and sugar, than the double-log estimates. The estimates obtained with the double-log inverse function tended to be somewhat lower than those obtained with the double-log function except for cheese. In fact the results tended to show that rice and vegetable lard may become inferior food commodities at high income levels.

In the remainder of this section we have employed the double log function, since the income ranges become considerably smaller when stratifying the population, especially by socioeconomic status.

The expenditure elasticity of all foods for the whole urban sample was estimated at .63 by the double-log function; that of the key food group at .57. Thus, with total household expenditure increases, expenditures on all other foods as a group (other than the key foods) increase by some proportion greater than .63. The marginal food budget shares of eggs, milk and cheese were the highest among the listed food items for the urban sample while those of rice, vegetable lard and plantain were the lowest. More revealing patterns of marginal food budget shares should become evident when stratifying the urban population.

Food expenditure functions by region and city size.

The results presented in Table 5.4 examine the extent to which there are regional and city-size effects on the expenditure elasticities of foods as a whole and of selected food items. The marginal expenditure shares of all foods tended to decrease with larger city size, but were similar between

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TABLE 5.4
Expenditure Elasticities of Food Expenditures and of Selected Food Items
of Urban Populations Stratified by Region and City Size
(Holding Household Size Constant)

Food Item Category	Highlands			Coast		
	LT 40,000	GT 40,000	Quito	LT 40,000	GT 40,000	Guayaquil
All foods	.70 (.01)	.65 (.01)	.60 (.01)	.68 (.01)	.65 (.01)	.59 (.01)
41 key foods	.73 (.02)	.61 (.01)	.49 (.01)	.57 (.02)	.54 (.01)	.50 (.02)
Rice	.41 (.03)	.31 (.02)	.17 (.02)	.26 (.02)	.18 (.02)	.05 (.02)
Bread	.57 (.03)	.44 (.02)	.34 (.02)	.61 (.04)	.47 (.02)	.39 (.02)
Beef (w/bones)	.36 (.05)	.35 (.03)	.37 (.03)	.48 (.03)	.37 (.03)	.43 (.03)
Vegetable lard	.24 (.04)	.17 (.04)	.17 (.03)	.42 (.03)	.23 (.03)	.33 (.06)
Eggs	.69 (.04)	.70 (.03)	.61 (.03)	.73 (.05)	.73 (.03)	.77 (.03)
Milk	.62 (.03)	.55 (.02)	.61 (.02)	.86 (.05)	.72 (.03)	.71 (.03)
Cheese	.38 (.05)	.62 (.03)	.71 (.03)	.50 (.05)	.70 (.03)	.87 (.03)
Onions	.31 (.03)	.27 (.02)	.37 (.02)	.41 (.03)	.46 (.02)	.49 (.02)
Tomatoes	.40 (.03)	.45 (.02)	.43 (.02)	.58 (.03)	.56 (.02)	.43 (.02)
Potatoes	.40 (.06)	.33 (.04)	.14 (.03)	.48 (.03)	.41 (.03)	.29 (.02)
Plantain	.27 (.04)	.24 (.03)	.28 (.03)	.12 (.05)	.22 (.03)	.35 (.03)
Sugar	.30 (.03)	.35 (.02)	.23 (.02)	.39 (.02)	.34 (.02)	.31 (.02)
Coffee (ground)	.34 (.05)	.51 (.03)	.39 (.03)	.44 (.06)	.37 (.04)	.48 (.04)

( ) standard error.

highland and coastal households when holding city size constant. The city-size effect on the marginal expenditure shares of the key foods group was much stronger among highland households than coastal households; these marginal expenditure shares were significantly higher among highland than coastal households all residing in small cities.

The marginal food budget shares of rice and plantain were generally higher among highland households, while those of beef, vegetable lard, eggs, bread, milk, cheese, onions, tomatoes and potatoes were generally higher among coastal households. The marginal food budget shares of rice, bread and potatoes showed a clear negative city-size effect, and that of cheese a positive effect among highland households. While among coastal households a negative city-size effect was evident for rice, bread, tomatoes, potatoes and sugar, and a positive effect for cheese, onions and plantain. The differences in marginal food budget shares and marginal expenditure shares of foods is most likely due to both differences in mean household income levels and in such extraneous variables as relative food prices, food marketing and distribution, household savings opportunities, etc.

Food expenditure functions by region, city size and socioeconomic status (SES).

Ranges of expenditure elasticities over an income spectrum for urban populations stratified by region and city size are provided in Tables 5.5 and 5.6. The sub samples with APLIANCE = 0 are thus assumed to be at the lower end of the income distribution, and those with APLIANCE = 3+, at the upper end. Following Engel's Law we expect the marginal expenditure shares of all foods to be significantly higher among the low SES sub-samples, which was indeed the case. The marginal expenditure shares for the key foods group followed the same pattern, and were quite uniform for all high SES

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TABLE 5.5

Expenditure Elasticities of Food Expenditures and of Selected
Food Items of Highland Urban Populations Stratified
by City Size and by High/Low SES (Holding
Household Size Constant)

Food Item Category	LT 40,000 APLIANCE		GT 40,000 APLIANCE		Quito APLIANCE	
	0	3+	0	3+	0	3+
All foods	.83 (.03)	.52 (.06)	.79 (.03)	.54 (.03)	.76 (.09)	.53 (.03)
41 key foods	.83 (.05)	.44 (.07)	.67 (.06)	.43 (.03)	.67 (.21)	.38 (.03)
Rice	.47 (.09)	.18* (.12)	.55 (.07)	.19 (.05)	.98 (.21)	.12 (.04)
Bread	.46 (.08)	.59 (.11)	.43 (.07)	.30 (.04)	.32* (.24)	.20 (.0)
Beef (w/bones)	.39 (.13)	.05* (.18)	.44 (.10)	.34 (.07)	.95 (.35)	.28 (.06)
Vegetable lard	.47 (.09)	-.06* (.17)	.45 (.16)	.01* (.10)	.10* (.20)	.12* (.06)
Eggs	.65 (.15)	.67 (.13)	.70 (.12)	.57 (.05)	.74 (.32)	.40 (.05)
Milk	.50 (.11)	.42 (.09)	.58 (.09)	.33 (.04)	.89 (.35)	.37 (.04)
Cheese	.34 (.15)	.55 (.15)	.92 (.15)	.45 (.06)	.43* (.70)	.50 (.05)
Onions	.40 (.11)	.17* (.11)	.50 (.09)	.12 (.04)	.23* (.20)	.28 (.04)
Tomatoes	.57 (.12)	.28 (.11)	.60 (.10)	.33 (.05)	.17* (.26)	.31 (.04)
Potatoes	.63 (.19)	.23* (.16)	.50 (.14)	.46 (.10)	-.25* (.39)	.04* (.06)
Plantain	.57 (.16)	.14* (.15)	.28 (.10)	.18 (.07)	-.38* (.48)	.24 (.06)
Sugar	.24 (.08)	.25* (.14)	.33 (.06)	.36 (.05)	.35* (.20)	.21 (.05)
Coffee (ground)	.17* (.11)	.27* (.22)	-.42 (.12)	.36 (.07)	.50* (.35)	.31 (.07)

( ) standard error.   *p > .05

TABLE 5.6

Expenditure Elasticities of Food Expenditures and of Selected
Food Items of Coastal Urban Populations Stratified
by City Size and by High/Low SES
(Holding Household Size Constant)

Food Item Category	LT 40,000 APLIANCE		GT 40,000 APLIANCE		Guayaquil APLIANCE	
	0	3+	0	3+	0	3+
All foods	.86 (.02)	.53 (.08)	.69 (.02)	.57 (.03)	.79 (.05)	.57 (.02)
41 key foods	.77 (.03)	.45 (.07)	.49 (.05)	.40 (.03)	.73 (.08)	.46 (.03)
Rice	.51 (.05)	.16 (.08)	.34 (.05)	.10 (.04)	.32 (.09)	.03* (.04)
Bread	.72 (.09)	.36 (.10)	.34 (.08)	.10 (.04)	.32 (.13)	.03* (.04)
Beef (w/bones)	..68 (.06)	.17* (.11)	.41 (.09)	.41 (.07)	.33* (.18)	.40 (.06)
Vegetable lard	.66 (.05)	.19* (.11)	.35 (.06)	.25 (.06)	.49* (.31)	.26 (.11)
Eggs	.65 (.10)	.58 (.15)	.53 (.09)	.72 (.06)	1.10 (.17)	.73 (.05)
Milk	.94 (.14)	.63 (.12)	.62 (.12)	.40 (.06)	1.22 (.21)	.54 (.04)
Cheese	.53 (.09)	.52 (.15)	.69 (.09)	.58 (.06)	.76 (.19)	.89 (.05)
Onions	.57 (.06)	.40 (.10)	.54 (.06)	.36 (.04)	.53 (.17)	.47 (.04)
Tomatoes	.71 (.07)	.57 (.09)	.76 (.07)	.41 (.05)	.86 (.13)	.42 (.04)
Potatoes	.69 (.06)	.37 (.14)	.59 (.08)	.40 (.06)	.40 (.16)	.27 (.04)
Plantain	.22 (.09)	.24* (.15)	.33 (.09)	.21 (.07)	.31* (.18)	.40 (.06)
Sugar	.51 (.05)	.34 (.09)	.47 (.05)	.28 (.04)	.43 (.10)	.29 (.04)
Coffee (ground)	.61 (.10)	.76 (.25)	.42 (.10)	.258 (.13)	.38 (.16)	.52 (.08)

( ) standard error.   *p > .05

The food items which are analyzed separately were selected based upon a high reporting frequency (see Table 3.6). Data from both rural surveys are presented, with the intention of providing ranges of estimates. In comparing the results of each survey, care must be taken about making inferences about seasonal effects. This would require a more rigorous analysis in which each household serves as its own control and only households of both surveys are included.

Mean per capita food expenditures were found to range from S/.1,951,308 (RHBS II) to S/.1,990,387 RHBS I) per six-months' period. Food expenditures represented on the average from 52.0 (RHBS II) to 53.1% (RHBS I) of total household expenditures. Expenditures on the 45 key foods as a group represented 44 percent of total household expenditures, and 83 percent of total food expenditures. Thus, as a group the 45 key food items represented an important share of all foods purchased. In addition, for certain rural households own production is an important source of household food supply as will become evident below.

Food expenditure patterns by region and farming status.

The average expenditure shares of foods, and the average food budget shares of selected food items, are presented in Table 5.7 for the rural population stratified by region and farming status. The average expenditure shares of all foods, and of the key food group, tended to be less among highland, non-farming households. Expenditures on bread, noodles, milk, potatoes and sugar tended to take up a larger share of household food budgets of highland than of coastal households. Expenditures on rice, beef, cheese and plantain constituted relatively a larger share of food budgets of coastal households. There were few major differences in the average food

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subsamples; but among highland low-SES households were significantly higher in smaller cities, while lower in bigger cities among coastal low-SES households.

There is too much detail in Tables 5.5 and 5.6, to comment on each food item separately. Some general comments will suffice. A zero expenditure elasticity coefficient for the high SES subsample indicates that saturation levels may be reached.[7] A positive coefficient below one means the food commodity is a necessity, while a coefficient greater than one characterizes it as a luxury. So, for example, expenditures on beef and vegetable lard are likely to reach saturation levels in response to increases in total expenditures among high-SES households residing in small cities in both the coast and the highlands. For low-SES households residing in Guayaquil, eggs and milk are luxury food commodities. It is also clear that there are regional and city-size differences in the marginal food budget shares holding SES levels constant. For example, among high-SES households in small cities, expenditures on onions reached saturation levels in the highlands, but the marginal food budget share was .40 in the coast. The marginal food buget share of rice among low-SES households was .98 in Quito, but only .32 in Guayaquil. Expenditures on plantain were a great deal more responsive to total expenditure change among low-SES households residing in small highland cities than when residing in big highland cities. This city-size effect was less evident among coastal, low-SES households.

5.2 Rural Food Expenditure Patterns.

Rural food expenditure patterns are presented in this section in the form of average and marginal expenditure shares of foods, and average food budget shares of selected food items, and their marginal expenditure shares.

budget shares of specific food commodities between farming and non-farming households. In the highlands, the expenditures on milk and eggs represented a higher percent of total food expenditures of non-farming than of farming households; this was also true to a lesser extent among coastal households. Own production was often an important source for these two commodities among rural households. The average food budget shares of noodles and rice tended to be higher in the highlands for farming than for non-farming households.

Food expenditure patterns of non-farming households.

The number of household facilities present (FACILITI) was previously identified as the primary stratification for socioeconomic status (SES). The average expenditure shares of all foods, and of the key foods group tended to decline with SES, especially among coastal and highland households with FACILITI = 2-3 (Table 5.8). Expenditures on the key foods remained a constant share of the food budget among the three SES levels in both the coast and the highlands. Among the highland households, the average food budget shares of rice, vegetable lard and sugar tended to decline with higher SES levels, while those of bread, beef, eggs, milk and cheese increased. For the remainder of the food commodities the average food budget share remained fairly constant across SES levels. The average food budget shares of rice, noodles, vegetable lard, onions and sugar decreased, and of bread, eggs and milk increased with higher SES levels of coastal households.

Expenditures on bread, noodles, milk, sugar and potatoes commanded a larger share of food budgets of low-SES households in the highlands than in the coast. The opposite was the case for expenditures on rice, beef, eggs, cheese, onions and plantain. The same pattern of differences in average food

TABLE 5.7
Food Expenditure Patterns of Rural Households Stratified by Region
and Farming Status (Average Expenditure Shares),
Rural Household Budget Surveys I and II
X̄ (SE)

Food Item Category	Rural Household Budget Survey I				Rural Household Budget Survey II			
	Highlands		Coast		Highlands		Coast	
	Non-Farming	Farming	Non-Farming	Farming	Non-Farming	Farming	Non-Farming	Farming
All foods	51.4 (1.1)	52.3 (0.5)	55.7 (0.8)	54.0 (0.5)	44.3 (1.4)	51.0 (0.5)	53.0 (0.9)	55.5 (0.6)
45 key foods	42.8 (1.0)	43.2 (0.5)	45.8 (0.8)	45.4 (0.5)	36.8 (1.2)	42.8 (0.5)	43.8 (0.9)	47.3 (0.5)
Rice	12.1 (0.6)	13.8 (0.3)	18.9 (0.5)	18.2 (0.5)	11.0 (0.6)	13.0 (0.3)	18.3 (0.6)	16.2 (0.5)
Bread	3.6 (0.3)	3.1 (0.1)	2.3 (0.1)	1.1 (0.1)	5.1 (0.5)	3.7 (0.2)	2.2 (0.1)	1.1 (0.1)
Noodles	4.7 (0.3)	6.5 (0.2)	1.8 (0.1)	2.6 (0.1)	4.2 (0.3)	6.1 (0.1)	1.5 (0.1)	2.4 (0.1)
Beef	8.6 (0.7)	7.2 (0.3)	14.1 (0.5)	13.8 (0.3)	10.0 (0.8)	7.6 (0.3)	14.2 (0.6)	14.3 (0.3)
Vegetable lard	4.3 (0.3)	4.9 (0.2)	5.0 (0.2)	7.7 (0.2)	4.5 (0.3)	6.2 (0.2)	4.3 (0.2)	7.6 (0.2)
Eggs	1.9 (0.2)	0.6 (0.1)	1.7 (0.1)	0.5 (0.1)	1.9 (0.2)	0.4 (0.1)	1.6 (0.1)	0.6 (0.1)
Milk	6.4 (0.7)	1.4 (0.1)	2.8 (0.3)	0.9 (0.1)	5.2 (0.5)	1.4 (0.1)	2.8 (0.2)	0.9 (0.1)
Cheese	0.8 (0.1)	0.7 (0.1)	2.9 (0.2)	3.4 (0.1)	1.2 (0.2)	0.7 (0.1)	2.7 (0.2)	3.6 (0.1)
Onions	2.4 (0.1)	2.5 (0.1)	2.6 (0.1)	3.3 (0.1)	3.4 (0.4)	3.2 (0.1)	3.5 (0.1)	4.9 (0.1)
Tomatoes	1.1 (0.1)	0.9 (0.0)	1.5 (0.1)	1.6 (0.1)	1.2 (0.1)	1.1 (0.1)	2.0 (0.1)	2.0 (0.1)
Potatoes	11.4 (0.7)	9.9 (0.3)	3.0 (0.1)	3.4 (0.1)	9.2 (0.8)	9.0 (0.3)	2.9 (0.1)	3.4 (0.1)
Plantain	1.2 (0.1)	1.7 (0.1)	3.1 (0.2)	2.7 (0.1)	1.5 (0.2)	2.3 (0.1)	3.3 (0.2)	3.5 (0.2)
Sugar	5.9 (0.3)	6.3 (0.2)	4.5 (0.2)	5.4 (0.2)	5.2 (0.3)	5.9 (0.2)	3.8 (0.2)	5.1 (0.2)

( ) standard error.

Food Item Category	Rural Household Budget Survey I						Rural Household Budget Survey II					
	Highlands			Coast			Highlands			Coast		
	FACILITI			FACILITI			FACILITI			FACILITI		
	0	1	2-3	0	1	2-3	0	1	2-3	0	1	2-3
All foods	56.0 (2.1)	57.3 (2.3)	45.3 (1.4)	61.6 (1.4)	56.4 (1.7)	50.4 (1.2)	49.8 (3.0)	47.9 (3.2)	40.3 (1.7)	58.0 (1.9)	56.2 (2.1)	49.2 (1.2)
45 key foods	46.6 (2.0)	48.2 (2.2)	37.3 (1.3)	51.8 (1.3)	45.9 (1.7)	41.0 (1.1)	41.5 (2.8)	39.7 (2.9)	33.4 (1.5)	48.6 (1.9)	47.3 (2.1)	40.0 (1.2)
Rice	16.3 (1.1)	12.3 (1.0)	9.3 (0.7)	22.9 (0.9)	19.0 (1.0)	15.7 (0.7)	17.6 (1.7)	10.5 (1.1)	8.2 (0.7)	22.7 (1.3)	21.2 (1.4)	14.9 (0.7)
Bread	2.5 (0.5)	4.4 (1.0)	3.9 (0.4)	1.2 (0.2)	2.5 (0.3)	3.2 (0.2)	3.4 (0.8)	4.7 (0.7)	6.1 (0.8)	0.7 (0.1)	1.6 (0.2)	3.3 (0.2)
Noodles	6.0 (0.5)	5.6 (0.7)	3.3 (0.3)	2.4 (0.2)	1.8 (0.1)	1.3 (0.1)	5.2 (0.5)	5.6 (1.0)	3.2 (0.3)	2.2 (0.2)	1.4 (0.1)	1.2 (0.1)
Beef	6.3 (0.8)	6.1 (0.8)	11.5 (1.3)	11.5 (0.7)	13.5 (1.1)	16.6 (0.9)	7.2 (1.3)	8.1 (1.5)	12.0 (1.3)	13.6 (1.1)	12.1 (1.3)	15.4 (0.8)
Vegetable lard	5.9 (0.6)	5.1 (0.7)	2.8 (0.3)	6.8 (0.3)	5.2 (0.4)	3.4 (0.2)	6.7 (0.8)	5.5 (0.9)	3.1 (0.3)	6.1 (0.4)	4.3 (0.4)	3.3 (0.2)
Eggs	0.8 (0.2)	1.9 (0.6)	2.6 (0.3)	0.9 (0.2)	1.5 (0.2)	2.4 (0.2)	0.5 (0.3)	0.9 (0.3)	2.8 (0.3)	1.0 (0.2)	1.3 (0.3)	2.0 (0.2)
Milk	3.4 (1.3)	5.9 (1.4)	8.5 (1.1)	0.7 (0.2)	2.4 (0.5)	4.6 (0.5)	1.4 (0.4)	3.8 (0.8)	7.3 (0.8)	0.6 (0.2)	1.5 (0.4)	4.6 (0.4)
Cheese	0.7 (0.3)	0.5 (0.2)	1.0 (0.2)	3.0 (0.3)	3.0 (0.5)	2.8 (0.2)	0.6 (0.2)	0.5 (0.2)	1.9 (0.4)	2.0 (0.3)	2.7 (0.3)	3.1 (0.2)
Onions	2.4 (0.3)	2.5 (0.3)	2.4 (0.2)	3.0 (0.1)	2.6 (0.2)	2.3 (0.1)	2.5 (0.3)	5.2 (1.7)	3.1 (0.3)	4.1 (0.3)	3.7 (0.3)	3.1 (0.2)
Tomatoes	1.1 (0.2)	1.2 (0.2)	1.1 (0.1)	1.4 (0.1)	1.4 (0.1)	1.6 (0.1)	1.0 (0.2)	1.0 (0.2)	1.3 (0.1)	2.0 (0.2)	1.8 (0.2)	2.1 (0.2)
Potatoes	9.2 (0.9)	13.5 (1.8)	11.7 (1.0)	3.4 (0.2)	2.7 (0.2)	2.9 (0.2)	9.9 (1.9)	8.0 (1.5)	9.3 (1.0)	3.2 (0.3)	3.0 (0.2)	2.6 (0.1)
Plantain	1.2 (0.3)	1.4 (0.3)	1.1 (0.1)	3.8 (0.5)	3.4 (0.4)	2.4 (0.2)	1.7 (0.5)	1.6 (0.3)	1.4 (0.2)	3.2 (0.4)	4.3 (0.6)	3.0 (0.2)
Sugar	6.0 (0.5)	5.7 (0.6)	5.9 (0.5)	5.5 (0.5)	4.4 (0.4)	3.6 (0.2)	7.0 (0.7)	5.4 (0.6)	4.3 (0.5)	5.1 (0.8)	4.2 (0.3)	3.0 (0.1)

budget shares of these food commodities between highland and coastal households was present at higher SES levels.

Food expenditure patterns of farming households.

Land area under cultivation (HECTA) was selected as the primary stratification variable for farming households. The average expenditure shares of all foods ranged from about 54 percent among highland households with less than 1 ha (HECTA = 1) to 42.6-46.6% among those with more than 10 ba (HECTA = 5). The average expenditure shares of all foods tended to be higher in the coast, and ranged from 60.4% for small landholding households to 46.2-47.7% for large landholding households. The average expenditure shares of the key foods group followed the same pattern as for all foods; total expenditures on the key foods group as percent of total food expenditures remained fairly constant for all households independently of size of landholding, and ranged from 82 to 83.5 percent for highland households, and 85.3-85.5 percent for coastal households (Table 5.9).

Comparing highland households with small landholdings (HECTA = 1) and those with large landholdings (HECTA =5), we note that the average food budget shares of bread, noodles, milk and potatoes decreased, and of beef and vegetable lard increased among the households with large landholdings. The same comparison for coastal households shows that the average food budget shares of rice, cheese and plantain fell, and of beef increased, with landholding size. Independently of landholding size, the average food budget shares of bread, noodles, milk, potatoes and sugar of highland households exceeded those of coastal households, whose average food budget shares of rice, beef, vegetable lard, cheese, onions, tomatoes and plantain exceeded those of highland households with different landholding sizes. Food

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TABLE 5.9

Food Expenditure Patterns of Rural Farming Households Stratified by Region
and Size of Land Holding

Rural Household Budget Surveys I and II

X (SE)

Food Item Category	Rural Household Budget Survey I						Rural Household Budget Survey II					
	Highlands			Coast			Highlands			Coast		
	HECTA			HECTA			HECTA			HECTA		
	1	3	5	1	3	5	1	3	5	1	3	5
All foods	54.2 (1.1)	53.3 (1.1)	46.6 (1.6)	60.2 (2.1)	54.0 (1.0)	47.7 (1.0)	54.0 (1.1)	50.8 (1.0)	42.6 (1.7)	60.6 (1.9)	59.3 (1.0)	46.2 (1.1)
45 key foods	44.2 (1.0)	44.2 (91.0)	39.4 (1.5)	51.3 (2.0)	46.0 (1.0)	40.6 (0.9)	44.6 (1.0)	43.3 (1.0)	35.2 (1.5)	51.7 (2.0)	50.9 (1.0)	39.6 (1.0)
Rice	11.8 (0.5)	14.5 (0.6)	14.4 (1.0)	20.0 (1.9)	18.0 (0.9)	18.2 (0.8)	11.3 (0.5)	13.9 (0.6)	11.0 (0.9)	19.7 (1.8)	16.6 (0.9)	14.9 (0.9)
Bread	3.2 (0.3)	3.1 (0.2)	2.4 (0.4)	1.1 (0.2)	1.3 (0.1)	1.2 (0.1)	4.4 (0.4)	3.7 (0.3)	2.4 (0.3)	1.4 (0.4)	0.9 (0.1)	1.3 (0.1)
Noodles	5.9 (0.3)	7.1 (0.3)	5.3 (0.4)	2.3 (0.2)	2.7 (0.1)	2.7 (0.1)	5.6 (0.3)	6.8 (0.3)	4.5 (0.3)	2.5 (0.3)	2.2 (0.1)	2.7 (0.2)
Beef	7.4 (0.5)	5.9 (0.4)	11.0 (1.3)	14.6 (1.3)	14.1 (0.6)	14.1 (0.6)	8.4 (0.6)	6.4 (0.5)	10.6 (1.1)	12.9 (1.6)	12.6 (0.5)	16.5 (0.8)
Vegetable lard	3.4 (0.3)	5.7 (0.4)	7.0 (0.9)	8.4 (0.7)	7.8 (0.3)	7.6 (0.4)	4.4 (0.4)	6.9 (0.4)	6.9 (0.7)	7.3 (0.9)	7.5 (0.3)	7.5 (0.4)
Eggs	0.8 (0.2)	0.3 (0.1)	0.8 (0.3)	0.5 (0.2)	0.4 (0.1)	0.5 (0.1)	0.6 (0.1)	0.4 (0.1)	0.5 (0.2)	1.0 (0.3)	0.5 (0.1)	0.5 (0.1)
Milk	2.4 (0.3)	1.0 (0.2)	0.8 (0.3)	0.8 (0.4)	0.9 (0.2)	0.7 (0.1)	2.5 (0.3)	1.1 (0.2)	1.2 (0.4)	0.5 (0.2)	1.2 (0.2)	0.7 (0.2)
Cheese	0.4 (0.1)	0.8 (0.2)	1.0 (0.3)	3.5 (0.5)	4.2 (0.3)	2.4 (0.2)	0.5 (0.1)	0.5 (0.1)	0.7 (0.2)	3.7 (0.6)	4.1 (0.3)	2.4 (0.3)
Onions	2.5 (0.2)	2.7 (0.3)	3.0 (0.4)	3.1 (0.2)	3.4 (0.2)	3.1 (0.1)	3.0 (0.2)	3.3 (0.2)	3.6 (0.3)	4.7 (0.4)	5.2 (0.2)	4.9 (0.2)
Tomatoes	1.0 (0.1)	0.9 (0.1)	1.1 (0.1)	1.6 (0.2)	1.5 (0.1)	1.6 (0.1)	0.9 (0.1)	1.2 (0.2)	1.5 (0.2)	2.1 (0.3)	2.0 (0.1)	2.1 (0.1)
Potatoes	13.0 (0.7)	8.4 (0.6)	6.5 (0.7)	3.0 (0.3)	3.2 (0.1)	3.8 (0.2)	11.5 (0.7)	8.0 (0.6)	7.4 (0.7)	3.2 (0.3)	3.3 (0.1)	3.7 (0.2)
Plantain	1.5 (0.3)	2.0 (0.2)	1.3 (0.2)	3.1 (0.5)	2.9 (0.3)	2.2 (0.3)	1.6 (0.2)	3.5 (0.4)	2.5 (0.8)	3.7 (0.6)	3.9 (0.3)	2.1 (0.2)
Sugar	6.1 (0.3)	6.6 (0.40)	7.6 (0.8)	4.9 (0.3)	5.2 (0.2)	5.6 (0.3)	6.0 (0.3)	5.7 (0.3)	5.3 (0.5)	5.4 (0.6)	6.0 (0.4)	4.5 (0.2)

( ) standard error.

purchasing patterns do not seem to differ markedly among farming households with different landholdings, except that the average expenditure shares of all foods is significantly lower among households with larger landholdings.

Household production of food: farming households.

Household production of food can be an important source of household food supplies among farming households. For a number of food commodities the percentages of highland and coastal farming households which reported having allocated from household production a certain quantity for self-consumption during the last 3 months are presented in Table A.5.4. There were some distinct regional differences. Household production of maiz, dry beans, potatoes, pork, and milk is a source of food supplies for more highland than coastal households. The reverse was true for household production of rice, plantain, cheese and chicken eggs.

It is reasonable to assume that when households partly depend on own production for food supplies that their food expenditurs decrease. It was found that both for highland and coastal farming households the average food budget shares of rice, potatoes, plantain, milk and eggs was significantly (p <.01) lower when the household produced those food commodities at least partly for self-consumption (Table 5.10). This was also true for other food commodities which had much lower expenditure reporting frequencies, except pork.

Food expenditure functions by region and farming status.

As for the urban survey, the marginal expenditure shares were estimated by the double-log functional model, with household size and total household expenditures as the independent variables. The expenditure elasticity coefficients are presented in Tables 5.11 and 5.12 for rural

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TABLE 5.10

Average Food Budget Shares for Selected Food Commodities of Farming
Households Stratified by Region and Dependency
on Household Production
Rural Household Budget Surveys I and II
X (SE)

Food Item	Rural Household Budget Survey I				Rural Household Budget Survey II			
	Highlands		Coast		Highlands		Coast	
	0^a	1^a	0	1	0	1	0	1
Rice	13.8 (0.3)	*	19.9 (0.5)	6.5 (1.0)	13.0 (0.3)	*	17.0 (0.5)	2.9 (1.1)
Potatoes	10.8 (0.4)	5.1 (0.7)	3.4 (0.1)	0.4 (0.4)	10.0 (0.3)	3.0 (0.6)	3.4 (0.1)	*
Plantain	1.8 (0.1)	0.2 (0.2)	3.5 (0.2)	0.3 (0.1)	2.5 (0.2)	0.3 (0.2)	4.8 (0.2)	0.4 90.1)
Milk	2.0 (0.2)	0.2 90.1)	1.1 90.1)	0.1 (0.0)	2.0 (0.2)	0.2 (0.1)	1.1 (0.1)	0.01 (0.01)
Eggs	1.0 (0.2)	0.2 (0.1)	0.9 (0.1)	0.2 (0.0)	0.8 (0.1)	0.2 (0.0)	2.0 (0.3)	0.3 (0.1)

[a]0 = no consumption from household production. ( ) standard error.

1 = consumption from household production.

( ) standard error.

*Insufficient cell frequency.

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households stratified by region and farming status. The estimates obtained with the two surveys will indicate ranges.

The marginal expenditure shares of all foods, and of the key foods group ranged from .77-.80 and from .72-.79, respectively, in the whole sample. Food commodities with relatively high expenditure elasticities were rice (.59-.63), bread (.60-.65), beef (.56-.63), eggs (.57-.59), milk (.59-.60) and onions (.52-.53). None of the foods listed appeared to be either an inferior or a luxury goods, as all estimated elasticity coefficients fell between zero and one.

The marginal expenditure shares of all foods, and of the key foods group tended to be higher among highland households, and among the latter, higher among farming than non-farming households.

Comparing farming and non-farming household residing in the highlands the marginal expenditure shares of eggs, beef, cheese, tomatoes, and plantain were higher, and of rice, bread, milk, potatoes and sugar lower for non-farming households. These same differences did not necessarily exist among coastal households. The marginal expenditure shares of milk, rice, noodles, vegetable lard, onion, plantain and sugar were relatively higher, and of bread and beef relatively lower, for farming households. None of the food commodities listed appeared to be either an inferior or luxury good for any of the four sub-samples.

Further stratification of farming households was attempted in order to investigate the effect of relying on household production for part of the food supply on the marginal expenditure shares of selected food items. However, the low frequency of non-zero expenditures by households which depended on household production rendered this not feasible.

TABLE 5.11
Expenditure Elasticities of Food Expenditures and Expenditures
on Key Foods and Selected Food Items for Rural Population
Stratified by Region and Farming Status
Rural Household Budget Survey I

Food Item Category	Whole Sample	Highlands		Coast	
		Non-Farming	Farming	Non-Farming	Farming
All foods	.80 (.01)	.81 (.03)	.82 (.01)	.73 (.02)	.71 (.02)
45 key foods	.79 (.01)	.78 (.03)	.80 (.02)	.66 (.03)	.69 (.02)
Rice	.63 (.02)	.53 (.05)	.57 (.02)	.36 (.03)	.49 (.03)
Bread	.65 (.02)	.59 (.07)	.67 (.04)	.68 (.08)	.49 (.05)
Noodles	.15 (.01)	.29 (.04)	.26 (.02)	.14 (.05)	.30 (.03)
Beef	.63 (.02)	.70 (.05)	.54 (.03)	.72 (.05)	.52 (.03)
Vegetable lard	.37 (.01)	.23 (.05)	.30 (.02)	.30 (.04)	.45 (.03)
Eggs	.59 (.03)	.71 (.07)	.49 (.08)	.56 (.07)	.52 (.09)
Milk	.59 (.03)	.49 (.06)	.59 (.06)	.57 (.10)	.74 (.13)
Cheese	.35 (.02)	.44 (.08)	.21 (.05)	.41 (.06)	.37 (.03)
Onions	.52 (.01)	.50 (.05)	.46 (.02)	.34 (.04)	.45 (.03)
Tomatoes	.46 (.02)	.40 (.05)	.34 (.03)	.49 (.05)	.44 (.03)
Potatoes	.24 (.02)	.44 (.06)	.44 (.03)	.38 (.05)	.43 (.03)
Plantain	.44 (.03)	.39 (.07)	.36 (.04)	.08* (.08)	.46 (.06)
Sugar	.45 (.01)	.40 (.04)	.57 (.02)	.27 (.04)	.47 (.03)

( ) standard error.   *p > .05

TABLE 5.12
Expenditure Elasticities of Food Expenditures and Expenditures
on Key Foods and Selected Food Items for Rural Population
Stratified by Region and Farming Status
Rural Household Budget Survey II

Food Item Category	Whole Sample	Highlands		Coast	
		Non-Farming	Farming	Non-Farming	Farming
All foods	.77 (.01)	.72 (.03)	.77 (.01)	.76 (.04)	.69 (.02)
45 key foods	.72 (.01)	.66 (.03)	.73 (.01)	.68 (.04)	.63 (.02)
Rice	.59 (.02)	.39 (.05)	.51 (.02)	.32 (.04)	.54 (.03)
Bread	.60 (.02)	.55 (.06)	.61 (.03)	.74 (.08)	.52 (.04)
Noodles	.17 (.01)	.25 (.04)	.26 (.02)	.19 (.05)	.31 (.03)
Beef	.56 (.02)	.50 (.06)	.46 (.02)	.61 (.05)	.57 (.03)
Vegetable lard	.33 (.01)	.24 (.05)	.27 (.02)	.35 (.05)	.41 (.03)
Eggs	.57 (.04)	.58 (.09)	.45 (.08)	.70 (.07)	.57 (.09)
Milk	.60 (.03)	.49 (.08)	.59 (.06)	.52 (.10)	.75 (.09)
Cheese	.32 (.02)	.34 (.07)	.18 (.05)	.41 (.06)	.42 (.04)
Onions	.53 (.02)	.42 (.05)	.45 (.02)	.43 (.05)	.47 (.03)
Tomatoes	.41 (.02)	.44 (.05)	.34 (.03)	.42 (.05)	.42 (.03)
Potatoes	.29 (.02)	.41 (.08)	.51 (.03)	.32 (.05)	.41 (.03)
Plantain	.32 (.03)	.30 (.07)	.26 (.04)	.23 (.08)	.29 (.05)
Sugar	.41 (.01)	.32 (.04)	.50 (.02)	.34 (.04)	.35 (.02)

( ) standard error.

5.3 Comparing urban and rural food expenditure patterns.

When comparing the results obtained with the urban and rural surveys, although not strictly comparable, the following patterns emerge.

1. Total food expenditures represented a relatively greater share of total household expenditures for rural households, especially in the coastal regions. Expenditures on the key foods group, although slightly different in composition, represented a significantly higher proportion of total household expenditures and of food budgets of rural households. both in the highlands and in the coast.

2. Expenditures on rice, beef, vegetable lard, onions, potatoes, plantain and sugar figured relatively more importantly in the food budgets of rural households, while expenditures on milk, bread, and eggs represented relatively larger shares of food budgets of urban households. This was generally true for both highland and coastal households.

3. The marginal expenditure shares of all foods and of the key foods group were significantly higher for rural populations; this was true for populations residing in the coast and in the highlands.

4. The marginal expenditures shares of rice, bread, beef, vegetable lard, onions, plantains and sugar were significantly higher for rural populations indicating that expenditures on these food commodities are likely to expand in much larger proportions in response to increases in household expenditure levels in rural areas. Expenditures on eggs, milk cheese and potatoes were more responsive to changes in household expenditures in urban areas. These same differences between urban and rural populations prevailed comparing households residing in highland and coastal regions. Exceptions were the marginal expenditures shares

of onions which tended to be higher among coastal urban households than coastal rural households, and of potatoes which was higher among rural highland households than urban highland households.

6.   HEALTH EXPENDITURE PATTERNS IN URBAN AND RURAL ECUADOR.

In order to present health expenditure patterns in this report the same approach is followed here as in relation to food expenditure patterns presented in the previous section: average and marginal expenditure shares are presented for all health care expenditures is well as for specific categories of health care.   The latter were selected as before based upon their frequency of reporting among sample households.   Non-reporting of a specific expenditure item was assumed to mean zero expenditure in computing average expenditure shares.   However, in computing marginal expenditure shares, households which did not report an expenditure were excluded.   The effect of this in terms of introducing biased estimates of the expenditure elasticities is uncertain.   If non-reporting indeed meant zero expenditure, the estimate of the expenditure elasticities may be biased upward.   On the other hand, if non-reporting meant absence of data, the estimates may be either upward or downward biased.

The expenditure patterns are presented for similarly stratified population groups as are the food expenditure patterns in the previous section.   For the urban survey this means that region, city-size and socioeconomic status are the main stratification variables.   Region, farming status and socioeconomic status are the stratification variables for the rural samples.

6.1. Health expenditure patterns in urban Ecuador.

Almost forty-two percent of the total urban sample reported no health care expenditures at all.   Total expenditures on health care as percent of total household expenditures ranged from 0 to 74 percent, with a mean of 3.3% (SE:0.06).   Because of the high percent of households with presumably zero health care expenditures, these expenditures generally represented a

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very small portion of total household expenditures. Among the various health expenditure categories, those with most frequently reported positive expenditures were: medicines and drugs (47.3%), outpatient visits (34.3%) and dental care (9.6%). All other categories had a reporting frequency of less than 5 percent (Table 3.3). Expenditures on medicines and drugs represented on the average 64 percent of total health expenditures; the same percent for outpatient visits was 16.5 percent, and 7.4 percent for dental care expenditures. For all other health care categories, expenditure represented less than 5 percent of total health expenditures on the average.

Health expenditures by region and city size.

Mean per capita annual expenditures as well as expenditures as percent of total expenditures for population groups stratified by region and city size are presented in Table 6.1. Mean per capita health expenditures tended to increase with city size among both highland and coastal cities. The same appears true for mean per capita expenditures in the three categories, except that per capita expenditures on outpatient visits in coastal towns >40,000 inhabitants is less than in smaller coastal town. Mean per capita expenditures on all health care categories, as well as on dental care, tended to be higher in highland towns than in coastal towns.

Total health expenditures as percent of total household expenditures appeared to be relatively stable across regions and city size. This means that total health expenditures tended to increase with total household expenditures in even proportions. This observations is borne out further with additional analysis of marginal expenditure shares. Expenditures on outpatient visits as percent of the total health care budget is higher in Quito than in other highland cities, and higher in small coastal towns than in other

TABLE 6.1

Health Expenditure Patterns of Urban Households Stratified
by Region and City Size

Health Care Category	HIGHLANDS						COAST					
	LT 40,000		GT 40,000		QUITO		LT 40,000		GT 40,000		GUAYAQUIL	
	A S/.	B %	A S/.	B %	A S/.	B %	A S/.	B %	A S/.	B %	A S/.	B %
All	421 (39)	3.2[a] (0.2)	794 (45)	4.1[a] (0.1)	1323 (177)	3.3[a] (0.2)	380 (24)	3.3[a] (0.2)	488 (24)	2.9[a] (0.1)	1032 (100)	3.0[a] (0.1)
Outpatient visits	43 (9)	12.5 (1.2)	67 (4)	11.6 (0.5)	203 (16)	20.0 (1.0)	69 (6)	30.3 (1.5)	39 (2)	11.1 (0.6)	112 (10)	19.6 (1.0)
Dental care	19 (3)	10.6 (1.3)	51 (5)	9.8 (0.6)	86 (10)	10.6 (0.9)	6 (2)	3.9 (0.6)	14 (3)	5.6 (0.6)	35 (7)	3.4 (0.5)
Medicines and drugs	266 (30)	57.2 (1.9)	447 (20)	66.1 (0.9)	577 (36)	59.8 (1.3)	260 (18)	53.7 (1.6)	372 (18)	75.1 (0.9)	601 (50)	62.0 (1.3)

A: per capita expenditure/year.
B: expenditure as percent of total health expenditures.
( ) standard error.

[a] As percent of total household expenditures.

coastal cities, or in small highland towns. Dental care expenditures as percent of the total health care budget tended to be higher in highland cities than in coastal cities, but fairly constant over city size. In large coastal towns this percentage tended to be higher than in either small coastal towns or in Guayaquil. Despite increasing per capita expenditures on medicines and drugs with city size, these expenditures maintained a relatively constant share of the total health care budget among highland cities of different sizes. Among coastal cities, expenditures on medicines and drugs represented a significantly larger share of the health care budget among household in large towns than in small towns or in Guayaquil.

Health expenditure patterns by socio-economic status (SES).

As was explained in Section 4, the variable APLIANCE (number of household appliances present) was selected as the primary SES stratification variable for urban households. This was done because one of the objectives of the study was to identify a variable or variables other than household income to represent the construct SES. In Tables A.6.1 and A.6.2. are presented mean per capita annual expenditures on health care, and on the three health care categories separately, by region, city size and SES. As may be expected, per capita health care expenditures increased with higher levels of SES, within highland and coastal cities of different size. Interestingly, the difference in mean per capita expenditures on health care between low SES (APLIANCE = 0) and high SES classes (APLIANCE = 3+) appears to increase with city size, particularly among highland populations and in Guayaquil versus other coastal cities. This may reflect:

(a) differences in income inequality among cities of different sizes, with large cities having a higher degree of income inequality, and

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(b) differences in quality of medical care purchased by different SES groups, with higher SES households purchasing higher quality medical care.

The three remaining health care categories demonstrated similar trends, albeit not always as pronounced as for total health expenditures. Among households in small highland and coastal towns. Mean per capita expenditures on outpatient visits showed no clear pattern with SES. This points perhaps to a degree of uniformity in access to outpatient facilities in small towns. In some cases, significant increases in mean per capita expenditures are not evident across different SES groups until the highest, such as, for example, mean per capita expenditures on all health care, and on the three categories separately, among households in Quito, or on dental care in Guayaquil.

The average expenditure shares of health care demonstrated a different pattern with SES within highland cities of different sizes (Table 6.2). Among households in small highland towns, the mean expenditure share tended to decrease with SES, while among Quito households it tended to increase with SES. The pattern among households in large highland cities appeared to be to increase first and then fall again with increasingly higher SES levels. However, none of the differences are striking, except among households in small highland towns reflecting perhaps uniformity in medical facilities. The average share of the health care budget allocated for outpatient visits declined with SES in small highland towns, remained fairly constant across SES levels in large highland cities, and increased significantly among Quito households, especially between the lowest SES class and the remaining households. The average health care budget share allocated to dental care was significantly higher in SES III (APLIANCE = 2) and IV (APLIANCE = 3+) households than in lower SES households in small highland towns; showed no

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TABLE 6.2

Health Expenditure Patterns of Highland Urban Households Stratified by
City Size and Socioeconomic Status
X(SE)

Health Care Category	LT 40,000 APLIANCE				GT 40,000 APLIANCE				QUITO APLIANCE			
	0	1	2	3+	0	1	2	3+	0	1	2	3+
All[a]	3.9 (0.5)	3.2 (0.3)	2.8 (0.3)	2.5 (0.5)	3.8 (0.3)	4.6 (0.3)	4.1 (0.2)	3.5 (0.2)	2.6 (0.5)	3.0 (0.3)	3.4 (0.3)	3.4 (0.2)
Outpatient visits[b]	15.1 (3.0)	12.9 (1.0)	11.4 (2.2)	8.9 (3.1)	11.6 (1.4)	12.1 (1.0)	11.3 (0.8)	11.3 (0.8)	10.6 (4.4)	19.3 (2.4)	17.6 (1.8)	22.1 (1.3)
Dental care[b]	3.7 (1.6)	8.0 (1.7)	17.6 (3.1)	17.2 (4.7)	6.8 (1.6)	10.7 (1.4)	7.9 (1.0)	12.3 (1.3)	1.2 (1.2)	7.5 (1.8)	10.6 (1.7)	12.3 (1.3)
Medicines and drugs[b]	54.7 (4.5)	55.4 (2.9)	62.1 (3.7)	57.1 (5.7)	72.5 (2.4)	65.0 (1.8)	67.2 (1.5)	63.0 (1.6)	85.3 (5.0)	66.8 (2.9)	63.8 (2.5)	53.4 (1.7)

[a] Health expenditures as percent of total household expenditures.

[b] Expenditure as percent of total health expenditures.

TABLE 6.3

Health Expenditure Patterns of Coastal Urban Households Stratified by
City Size and Socioeconomic Status
X(SE)

Health Care Category	LT 40,000 APLIANCE				GT 40,000 APLIANCE				GUAYAQUIL APLIANCE			
	0	1	2	3+	0	1	2	3+	0	1	2	3+
All[a]	3.1 (0.2)	3.0 (0.2)	3.8 (0.5)	3.9 (0.5)	2.8 (0.2)	3.0 (0.2)	2.9 (0.2)	2.9 (0.2)	2.3 (0.5)	2.5 (0.3)	3.1 (0.4)	3.3 (0.2)
Outpatient visits[b]	33.9 (2.4)	30.6 (2.9)	28.1 (3.3)	22.1 (3.0)	10.4 (0.2)	13.3 (1.2)	10.4 (1.2)	9.8 (0.9)	29.7 (4.8)	24.7 (2.9)	20.7 (2.7)	16.5 (1.1)
Dental care[b]	3.2 (0.9)	2.4 (0.8)	5.7 (1.9)	6.7 (2.2)	4.5 (1.3)	3.8 (0.8)	7.6 (1.5)	6.9 (1.2)	0.2 (0.2)	2.4 (1.1)	1.3 (0.6)	4.7 (0.8)
Medicines and drugs[b]	48.7 (2.5)	56.9 (3.1)	56.5 (3.7)	58:6 (3.8)	77.5 (2.1)	74.5 (1.7)	76.9 (2.0)	72.8 (1.7)	59.0 (5.2)	56.4 (3.4)	60.8 (3.3)	64.4 (1.5)

[a] Health expenditures as percent of total household expenditures.

[b] Expenditure as percent of total health expenditures.

particular pattern with SES in large highland cities, and tended to increase with SES in Quito. In small highland towns, the mean health budget share of medicines/drugs remained fairly constant across SES levels, but tended to decline with SES among households in large cities and in Quito.

Somewhat different patterns emerged for the coastal urban sample of households (Table 6.3). The mean expenditure share of health care tended to increase with SES among households in small towns and in Guayaquil, but remained constant across SES levels in large cities. The average health care budget share allocated for outpatient visits also declined with SES among households in small coastal towns and in Guayaquil, and remained fairly constant across SES levels in large coastal cities. The average health care budget share allocated for dental care did not demonstrate a significant pattern with SES among households in any of the city size classes. Among households in small coastal towns the average health care budget share for medicines and drugs tended to increase with SES, but tended to remain fairly constant across SES levels in large cities and in Guayaquil.

Comparing Tables 6.2 and 6.3, it is evident that there were regional differences in the average health budget shares across SES levels among households in urban areas of various sizes.

We now turn to estimates of marginal expenditure shares of health care for urban population groups stratified by region and city size (Table 6.4). These estimates indicate by what proportion (percent) health care expenditures will change in response to a one percent increase in total household expenditures. It is generally agreed that the most appropriate functional model to estimate the expenditure elasticities of health care is a double-log model (3). As in the previous section, total household

expenditures instead of household income was used, thus subscribing to the permanent income hypothesis. The model estimated was thus:

$$E_h = \alpha E_t^{\beta} H^c$$

where, E_h = total health expenditures, or expenditures on a specific health care category,

E_t = total household expenditures,

H = number of persons/household,

β = estimated expenditure elasticity, or marginal budget share (presented in Table 6.4).

Among the urban households as a whole, the marginal budget shares for all health expenditures and for expenditures on dental care were relatively high (.85), while lower for expenditures on outpatient care and on medicines and drugs. The expenditure elasticity of health care appears to increase with city size in the highlands which trend is even stronger for the expenditure elasticity of expenditures on outpatient care: from zero in small highland towns to almost one in Quito. The reasons for this difference may include:

(a) less uniformity in quality of outpatient care facilities in Quito, and,

(b) higher income levels, and higher degree of income inequality in Quito.

The estimated marginal health care budget shares for dental care and medicines/drugs, demonstrated less variation among highland cities of different size.

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TABLE 6.4

Expenditure Elasticities on Health Care, by Urban Households (Holding Household Size Constant) Stratified by Region and City Size

Health Care Category		Highlands			Coast		
		LT 40,000	GT 40,000	Quito	LT 40,000	GT 40,000	Guayaquil
All	.85 (.02) n=5564	.56 (.08) n=501	.82 (.04) n=1518	.92 (.04) n=814	.93 (.07) n=753	.73 (.04) n=1173	1.18 (.05) n=805
Outpatient visits	.64 (.02) n=3260	.20* (.13) n=228	.46 (.04) n=925	.98 (.05) n=516	.57 (.08) n=443	.42 (.04) n=647	.94 (.05) n=501
Dental care	.85 (.05) n=918	.64 (.20) n=88	.83 (.09) n=324	.76 (.09) n=203	.63 (.24) n=67	.67 (.11) n=155	1.35 (.16) n=81
Medicines and drugs	.65 (.02) n=4498	.58 (.09) n=337	.64 (.03) n=1321	.73 (.04) n=671	.72 (.08) n=478	.70 (.04) n=1034	.85 (.05) n=657
Range of total household expenditures (S/.)/yr.	1,039- 1,323,097	1,039- 570,126	3,199- 1,063,052	6,454- 1,323,097	2,530- 479,818	1,414- 897,918	5,032- 1,233,563

*p > .10

( ) standard error.

Among households in coastal cities, those residing in Guayaquil demonstrated high expenditure elasticities for all four health care categories compared to other coastal cities and to highland cities of different sizes. For example, expenditures on all health categories and on dental care may increase more than proportionally in response to increases in total household expenditures. For outpatient care and medicines/drugs the increase in expenditures may be slightly less than proportional to increases in total household expenditures. It is likely thus that Guayaquil represents quite a different medical environment as well as higher income levels and more income inequality than other coastal towns of different sizes.

It is noteworthy to point out that our estimates of the expenditure elasticities of health care for households in Quito and Guayaquil are somewhat higher than the estimate reported by Musgrove (3) for Quito and Guayaquil combined: .904(.050). The difference is negligible for Quito however. The estimates are not quite comparable because of likely differences between the two surveys, such as:

(a) definitions of the health care category,

(b) samples, or sampling techniques employed, and

(c) time periods, with different price relationships between health- and non-health spending categories.

6.2. Health expenditure patterns in rural Ecuador.

Rural health expenditure patterns obtained with data from both rural surveys, indicated from here on as RHBS I and RHBS II, will be presented and discussed side by side. Each survey was analyzed separately so that caution must be taken to make inferences about seasonal effects when comparing results from both surveys. This would require a more complicated

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analysis in which within-household differences are carefully related to the time-periods when the first and second interview took place in the same household, so that seasonal differences can be documented for each sample household.

Almost 86 percent of the RHBS I households, and 92 percent of the RHBS II households reported positive health expenditures. Among RHBS I households, per capita health expenditures ranged from S/.0 to 1,260,000/half yr. with a mean of S/. 3,787 (SE: 380) and median expenditure of S/.567; total health expenditures represented on the average 6.9 percent of total household expenditures. The health care categories with the highest reporting frequency were (a) outpatient visits 37%, over-the-counter drugs ("analgésicos"): 53.1%, and medicines/vitamins: 47.3% (Table 3.6).

Per capita health expenditures ranged among RHBS II households from S/. 0 to 520,000/half yr. with a mean of S/. 3,069 (SE: 183) and median expenditure of S/. 600; total health expenditures represented on the average 6.1 percent of total household expenditures. The same health care categories as in the RHBS I had the highest reporting frequency: (a) outpatient visits: 37.3%, (b) over-the-counter drugs: 70.4%, and medicines/vitamins: 50.5%.

Health expenditure patterns by region and farming status

Health expenditure patterns of rural households stratified by region and farming or non-farming, are presented in Table 6.5 for both surveys. Among RHBS I households, the average budget share for health care was the highest among coastal farming households, and lowest among highland non-farming households. There was no difference between coastal and highland non-farming households. Among RHBS II households, the average budget share for health care did not vary much between regions, and between

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TABLE 6.5

Health Expenditure Patterns of Rural Households, Stratified by
Region and Farming and Non-Farming Households
Rural Household Budget Surveys I and II
X̄(SE)

Health Care Category	Rural Household Budget Survey I				Rural Household Budget Survey II			
	Highlands		Coast		Highlands		Coast	
	Non-Farming	Farming	Non-Farming	Farming	Non-Farming	Farming	Non-Farming	Farming
All[a]	5.3 (0.4)	6.3 (0.3)	5.4 (0.3)	7.6 (0.3)	5.8 (0.6)	6.3 (0.2)	5.7 (0.5)	6.1 (0.3)
Outpatient visits[b]	13.6 (1.2)	10.2 (0.5)	19.7 (1.3)	15.3 (0.8)	9.1 (0.9)	7.8 (0.3)	11.7 (0.9)	11.1 (0.6)
Over-the-counter drugs[b]	34.0 (2.3)	38.6 (1.1)	27.0 (1.8)	30.8 (1.3)	34.8 (2.5)	41.9 (1.1)	34.3 (2.1)	41.1 (1.4)
Medicines and vitamins[b]	42.3 (2.1)	38.1 (1.0)	40.7 (1.7)	42.5 (1.3)	43.7 (2.2)	38.5 (0.9)	41.2 (1.8)	37.9 (1.1)

[a] Total health expenditures as percent of total household expenditures.

[b] Expenditure as percent of total health expenditures.

farming, and non-farming households. The average share of the health care budget allocated for outpatient visits tended to be higher among RHBS I households than RHBS II households, and higher among coastal households in both surveys. Highland farming households allocated the lowest share of their health care budget to outpatient visits, and coastal non-farming households the highest share. The average share of the health care budget allocated to over-the-counter drugs was the highest among highland farming households, and the lowest among coastal non-farming households. Among RHBS II households, holding farming status constant, there were no regional differences in the average health budget share allocated to over-the-counter drugs. The average share of the health care budget allocated for medicines/vitamins was fairly stable across the different groups; among the RHBS I households, the lowest for highland farming households. This latter group had the lowest mean total household expenditure level, and may also represent the population group with the least access to medical facilities.

Health expenditure patterns by region and socio-economic status: non-farming households.

For non-farming households, the variable FACILITI (number of 3 types of facilities available: electricity, water and toilet) was selected as the primary stratification variable for socio-economic status (SES). The average budget share for health care tended to decrease with higher SES levels among coastal households, but showed greater stability across SES levels for highland households. The lack of stability in mean expenditure shares across the two surveys holding SES and region of residency constant may be due to several factors:

(a) not the same households are included in the sub-samples, and/or

(b) differences in certain conditions which affected total household expenditures and/or health expenditures between RHBS I and RHBS II.

We should, therefore, treat the estimates obtained with the two surveys as constituting ranges. We note then in Table 6.6. that the range in the average share of total expenditures allocated to health care is smaller among higher SES classes than among the lower ones, especially when holding region of residency constant.

The average health care budget share allocated to outpatient visits may vary considerably and may not strongly be associated with SES. For example, for highland low SES households, this share may range from 8.6 to 9.6%, and for high SES households from 10.0 to 17.2%; for coastal households, the same ranges may be 7.9 to 19.9%, and 13.5 to 21.0% respectively. Health care budget shares for over-the-counter drugs tended to decrease with higher SES levels among both coastal and highland households, while the opposite appears true for health care budget shares for medicines/vitamins. This may point to the fact that with higher expenditure levels the relative health care budget shares shift towards medicines/vitamins among rural, non-farming households.

Health expenditure patterns by region and socioeconomic status: farming households

For farming households we selected the area of land under cultivation as the primary stratification variable for socio-economic status. The mean expenditure share of health care tended to increase with higher SES levels among highland households, with no clear pattern indicated to coastal

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TABLE 6.6

Health Expenditure Patterns of Rural, Non-Farming Households Stratified by
Region and Socioeconomic Status
Rural Household Budget Surveys I and II
$\overline{X}$
(SE)

Health Care Category	Rural Household Budget Survey I						Rural Household Budget Survey II					
	Highlands			Coast			Highlands			Coast		
	FACILITI			FACILITI			FACILITI			FACILITI		
	0	1	2-3	0	1	2-3	0	1	2-3	0	1	2-3
All[a]	5.2 (0.8)	4.8 (0.7)	5.7 (0.7)	6.5 (0.6)	4.9 (0.8)	4.8 (0.4)	6.6 (1.5)	5.7 (1.1)	5.5 (0.8)	7.0 (1.0)	6.6 (1.3)	4.6 (0.5)
Outpatient visits[b]	8.6 (1.4)	12.3 (2.5)	17.2 (1.8)	19.9 (2.3)	16.9 (2.4)	21.0 (2.0)	9.6 (1.9)	6.2 (1.6)	10.0 (1.2)	7.9 (1.2)	12.1 (1.9)	13.5 (1.4)
Over-the-counter drugs[b]	44.0 (4.7)	3.53 (4.7)	27.3 (3.1)	28.0 (3.1)	34.3 (4.3)	22.5 (2.6)	40.9 (5.3)	40.6 (5.6)	29.7 (3.2)	38.7 (4.3)	33.4 (4.5)	32.3 (2.9)
Medicines and vitamins[b]	37.0 (4.0)	40.9 (4.3)	46.2 (2.9)	39.6 (3.0)	40.3 (3.7)	41.7 (2.6)	39.0 (4.4)	39.5 (5.2)	47.7 (3.0)	39.2 (3.7)	43.5 (4.1)	41.3 (2.5)

[a] Total health expenditures as percent of total household expenditures.

[b] Total expenditure as percent of total health expenditures.

household (Table 6.7). So, for example, the average budget share for highland households with less than 1 ha. may be around 5%, while for those households with more than 10 ha. it may range from 7.0 to 7.4%. Among coastal households these budget shares may range from 6.8 to 8.7 percent, for households with less than 1 ha. and 7.6-7.0% for those with more than 10 ha.

The average health care budget share for outpatient visits showed no particular pattern associated with the land area under cultivation among either coastal or highland households. Among the latter, however, we note again that the relative health care budget shares tended to increase medicines/vitamins and decrease for over-the-counter drugs. For example, among households with less than 1 ha. the average health care budget shares for these two categories ranged from 44.0 to 47.7%, and 35.1 to 35.6 %, which for households with more than 10 ha. these same ranges were 32.1-34.8%, and 42.2-44.8%. This pattern was not so clearly distinguishable among coastal households.

The marginal expenditure shares on health care for rural population groups stratified by region and farming status are presented in Tables 6.8 and 6.9. These estimates were obtained by means of the same model as for the urban samples. Comparing the results of the two surveys we note again that for certain health care categories and for several sub-samples there is little stability in expenditure elasticity estimates across surveys. Thus, for the same reason as indicated before, we treat the two estimates in each case as constituting a range.

For total health expenditures the elasticity coefficient clearly approximated one. Thus, among rural households as a whole, health expenditures are likely to increase by the same proportion as total household

TABLE 6.7

Health Expenditure Patterns of Farming Households Stratified by
Region and Area of Land Under Cultivation
Rural Household Budget Surveys I and II

$\bar{X}$
(SE)

Health Care Category	Rural Household Budget Survey I										Rural Household Budget Survey II									
	Highlands HECTA					Coast HECTA					Highlands HECTA					Coast HECTA				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
All[a]	5.1 (0.5)	6.3 (0.5)	6.4 (0.5)	7.7 (0.9)	7.4 (0.9)	8.7 (1.4)	6.9 (0.7)	8.0 (0.6)	7.5 (0.9)	7.6 (0.6)	4.9 (0.5)	6.7 (0.5)	6.0 (0.4)	7.8 (0.7)	7.0 (0.7)	6.8 (1.3)	5.4 (0.5)	4.7 (0.5)	5.9 (0.7)	7.8 (0.6)
Outpatient visits[b]	10.2 (1.0)	11.4 (1.0)	8.8 (0.9)	11.5 (1.5)	8.9 (1.2)	20.5 (3.8)	16.6 (1.9)	15.4 (1.4)	14.5 (2.0)	14.1 (1.2)	7.8 (0.7)	8.2 (0.6)	7.3 (0.6)	7.1 (0.8)	9.1 (1.0)	10.1 (2.0)	11.5 (1.4)	8.9 (1.0)	11.0 (1.3)	13.0 (1.1)
Over-the counter drugs[b]	44.0 (2.4)	37.4 (2.0)	40.0 (2.2)	33.8 (3.1)	32.1 (3.3)	27.4 (5.7)	35.2 (3.2)	30.3 (2.6)	30.9 (3.4)	29.0 (2.3)	47.7 (2.4)	43.0 (2.1)	42.0 (2.1)	35.3 (2.9)	34.8 (3.1)	39.0 (5.3)	42.7 (3.0)	45.2 (2.8)	44.0 (3.2)	35.3 (2.4)
Medicines and vitamins[b]	35.1 (2.1)	40.0 (1.8)	34.4 (1.9)	41.9 (2.8)	44.8 (3.0)	42.5 (5.6)	38.7 (2.9)	42.7 (2.4)	42.9 (3.2)	44.6 (2.2)	35.6 (2.0)	37.3 (1.8)	38.3 (1.8)	43.0 (2.7)	42.2 (2.8)	40.2 (4.7)	38.4 (2.6)	34.5 (2.2)	38.8 (2.8)	39.1 (2.1)

[a]Health expenditures as percent of total household expenditures.

[b]Expenditure as percent of total health expenditures.

expenditures. The marginal expenditure shares allocated for the three health care categories were considerably lower: outpatient care: .59-.63; over-the-counter drugs: .31-.34; medicines/vitamins; .63-.75. The comparison between the last two elasticity coefficients further suggests that the relative share of medicines/vitamins in the health care budget will increase, and that of over-the-counter drugs decrease, with higher total expenditure levels.

Health care budgets of highland non-farming households are likely to increase less rapidly in response to increased total expenditure levels than of highland farming households or of coastal rural households. Particularly among coastal farming households, total health expenditures are likely to increase more than proportionally to increases in total household expenditures. The marginal expenditure shares for outpatient visits ranged from .35-.52 for highland, non-farming households to .67-.70 for coastal farming households. The marginal expenditure share for medicines/vitamins was consistently higher among all four groups than for over-the-counter drugs. Expenditures on the latter are not likely to increase significantly in response to increased household expenditure levels.

6.3. Comparing urban and rural health expenditure patterns.

The more important differences and similarities in urban and rural health expenditure patterns may be summarized as follows:

1. Rural households tended to spend a greater percent of total household expenditures on health (6.1-6.9%) than urban households (3.3%). However, the percent of rural households reporting any health expenditures (86-92%) was also significantly higher than among the urban households (42%). Expenditures on outpatient visits as percent of total health expenditures tended to be somewhat lower among rural than among

TABLE 6.8

Expenditure Elasticities on Health Care of Rural Households
(Holding Household Size Constant) Stratified by
Region and Farming or Non-Farming Households
Rural Household Budget Survey I

Health Care Category	Whole Sample	Highlands		Coast	
		Non-Farming	Farming	Non-Farming	Farming
All health expenditures	.99	.83	.92	1.15	1.20
	(.03)	(.09)	(.05)	(.11)	(.08)
	n=3756	n=368	n=1699	n=505	n=1042
Outpatient visits	.59	.52	.56	.65	.67
	(.04)	(.12)	(.06)	(.11)	(.07)
	n=1622	n=170	n=623	n=261	n=493
Over-the-counter drugs	.34	.38	.34	.20	.21
	(.02)	(.06)	(.03)	(.08)	(.06)
	n=2331	n=230	n=1094	n=292	n=627
Medicines and vitamins	.75	.53	.74	.70	.91
	(.03)	(.08)	(.04)	(.10)	(.07)
	n=2075	n=211	n=875	n=296	n=598
Range of annual house- hold expenditures (S/.)/½ yr	0- 4,030,350	0- 2,025,536	0- 2,564,375	0- 2,500,060	17,860- 4,030,350

( ) = standard error.

TABLE 6.9

Expenditure Elasticities on Health Care of Rural Households
(Holding Household Size Constant) Stratified by
Region and Farming or Non-Farming Households
Rural Household Budget Survey II

Health Care Category	Whole Sample	Highlands		Coast	
		Non-Farming	Farming	Non-Farming	Farming
All health expenditures	.95	.66	.97	.94	1.19
	(.03)	(.09)	(.04)	(.12)	(.07)
	n=3738	n=303	n=1789	n=422	n=1110
Outpatient visits	.63	.35	.67	.51	.70
	(.04)	(.16)	(.06)	(.11)	(.07)
	n=1517	n=130	n=647	n=200	n=483
Over-the-counter drugs	.31	.24	.35	.35	.25
	(.02)	(.06)	(.02)	(.06)	(.04)
	n=2874	n=224	n=1333	n=318	n=922
Medicines and vitamins	.63	.33	.63	.71	.81
	(.03)	(.09)	(.04)	(.12)	(.07)
	n=2056	n=184	n=950	n=249	n=599
Range of annual house-hold expenditures (S/.)/½ yr	0-7,126,850	0-5,066,992	0-2,886,178	960-1,891,084	420-7,126,850

( ) = standard error.

urban households, while the average health care budget shares for medicines and drugs tended to be the same.

2. Both among urban and rural households the average share of the health care budget for outpatient visits tended to be greater for coastal than for highland households. However, the opposite was true for the average health care budget share for medicines and drugs. Also, the average expenditure share on health care tended to be greater for highland urban households than for coastal urban households, with the opposite the case among rural households.

3. The marginal expenditure share on health care was higher among rural than among urban households; the expenditure elasticities for outpatient visits and for medicines and drugs did not differ much between rural and urban population groups.

4. Among both urban and rural households the marginal expenditure shares of all health care, and of outpatient visits and medicines and drugs, tended to be consistently higher on the average when the region of residence was the coast.

7.   FINDINGS AND RECOMMENDATIONS

7.1. Summary of Findings.

The major findings related to food and health expenditure patterns in both urban and rural Ecuador have been detailed in the Executive Summary and at the end of the previous two sections. There is no need to repeat these here. It is clear that there are significant urban-rural and regional differences, and differences among SES levels, in the way households allocate their expenditures to food and health care, and their food and health care budgets to specific food and health care items.

The observed differences in average expenditure shares, and in average food and health care budgets shares, reflect both macro-and micro-level factors, and the interactions of these. · Without a detailed description of those macro-environments and how they relate to current expenditure patterns it is difficult to predict how changes in those macro-environments will impact on expenditure patterns of different population groups. For example, does the fact that coastal households spend a greater share of their health care budgets on outpatient visits than highland households reflect a difference in (a) health status, health seeking behavior and income levels, or (b) access to outpatient care facilities, market prices of outpatient care, or (c) a combination of (a) and (b)? Nutritional inferences are not possible from food expenditure patterns, unless quantities of food intake are available.

The patterns of food and health care expenditures based upon average expenditure shares can serve as a baseline against which to measure changes in expenditures over a time interval during which both macro-and micro-level changes took place. The estimated marginal expenditure shares serve as predictors of the magnitude of changes in expenditures as result of either

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broad or targeted income changes (under conditions of stable relative prices). By further disaggregating food and health care expenditures, projections can be made as to expansions in the demand for specific food commodities and for specific types of health care which are likely to accompany effective policies of income expansion over time and where these demand expansions will be relatively more pronounced.

7.2. Recommendations.

Two sets of recommendations are made here. The first set relates to further analysis of the existing data sets from the three surveys, while the second set relates to the design of future surveys.

1. A sensitivity analysis could be undertaken by redefining the classes of the demographic and socioeconomic stratification variables. The objective would be to draw out the most sharply contrasting expenditure patterns, in other words, to maximize the difference between the intra-and inter-class variation in mean and marginal expenditure shares. This would make the impact of highly targeted interventions more efficient.

2. Estimation of price elasticities of expenditures on food and health care from cross-sectional data is strictly speaking not possible. Any variation in reported market prices is presumably due to quality differences, or to measurement errors, the latter especially if reported from recall over an extended reference period. Not so surprisingly, many households did not report price data. Nevertheless, the available price data can be used to compute mean price levels for different food commodities and health care categories in different locations (region, city size). Differences in mean price levels can then be compared with

differences in mean expenditure levels and mean expenditure shares among different locations.

3. The expenditure functions which were estimated could be expanded in order to bring in additional household characteristics as independent variables. We defined the functions with household expenditures and size as the independent variables. Housing characteristics and presence/absence of facilities could be brought into the health expenditure functions.

4. The two rural surveys, since they were undertaken in the same households (with some attrition during the second survey) can be linked up by merging the separate data files. This will allow determination of changes in expenditure patterns and relating these to specific seasonal changes by having each household serve as its own control, and documenting the period interval between the two interviews in each household. This approach will also afford the estimation of more year-round food and health expenditure patterns in rural areas.

    Each of the above expansions of the analysis will require substantial additional computer work as further data transformations will be involved as well as statistical analysis.

5. Thought should be given to undertaking in conjunction with household level surveys, surveys at the community level. For example, a household survey that deals with health care expenditures and health facilities utilization should be complemented by data on existing health care facilities, access to those facilities, market prices charged, etc. Equally, household food expenditure data should be complemented by market survey data of food prices in different types of food retail outlets, access to those outlets, etc. Respondents in household surveys

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are not usually the best source for unit prices of food items, and cannot easily distinguish quality differences of the same food item.

6. The results of the factor analysis undertaken here suggests that there are variables other than household income which may be used to stratify for socioeconomic status. Such variables may be relatively easy to construct, and require little and only objective data. On the other hand, to construct a total household income variable especially for rural households whose income is partly in kind, often requires a great deal of data, most of it sensitive in nature, i.e. cannot be observed by the interviewer but must be reported by the respondent. Some of these data are available from national population and housing census so that the multi-stage sampling procedure can be extended to include a SES stratification variable.

7. In designing household level surveys it is important that data processing/management personnel and statistical analysts provide input early on, and also remain involved during the implementation of the survey. For example, in the current survey it was impossible to distinguish between zero expenditure on a specific item and missing data. This may reflect the way in which the expenditure data by item was obtained: in an open-ended fashion or by reading off all expenditure items listed on the form. However, missing data must be distinguishable from the real number zero. A plan of statistical analysis, designed based upon the stated objectives of the survey, must guide the data processing management activities so that data files are structured in such a way as to require a minimum of data transformations for statistical analysis.

FOOTNOTES

1. Non-reporting of expenditures may mean zero expenditure during the reference period or missing data. No distinction was made in the coded data, so we assumed zero expenditure.

2. For a description of the factor analysis technique, see (13). The SPSS Manual (14) also contains a brief description of this technique, and how to interpret the results.

3. These are: (a) household income (INCOME), (b) formal education completed by head of household (EDUC), (c) housing density (HOUSDEN), (d) presence/absence of water, electricity and toilet (FACILITI), (e) number of electric appliances present (APLIANCE), and (f) housing construction (HOUSQUAL).

4. A similar result was obtained with the non-parametric correlation analysis of INCOME with HOUSQUAL [Kendall tau: 0.456 ($p < 0.01$)], APLIANCE [0.585 ($p < 0.01$)] and EDUC [0.465 ($p < 0.01$)].

5. A priori, it is difficult to state what the minimum sub-sample size should be to produce valid mean estimates without knowing what the shape of the distributions of the dependent variables is.

6. If we had specified the minimum eigenvalue at .99 two factors would also have been generated for coastal farming households.

7. The non-significant estimates for the low SES households residing in Quito and Guayaquil are the result of a low sub-sample frequency and should be discarded.

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Table A.3.1

Urban Household Budget Survey, 1975/76
geographic distribution of sample households.

REGION:	CITY:	No. of HOUSEHOLDS:	PERCENT	
			TOTAL:	REGION:
COAST	Guayaquil	1,421	14.9	29.0
	Portoviejo	456	4.8	9.3
	Esmeraldas	603	6.3	12.3
	Machala	588	6.2	12.0
	Manta	533	5.6	10.9
	Catamara	67	0.7	1.4
	Naranjal	129	1.4	2.6
	Rocafuerte	86	0.9	1.8
	Ventanas	141	1.5	2.9
	Balzar	242	2.5	4.9
	Babahoyo	642	6.7	13.1
	TOTAL	4,908	51.6	100.0
HIGHLANDS	Quito	1,120	11.8	24.3
	Ambato	622	6.5	13.5
	Riobamba	483	5.1	10.5
	Cuenca	600	6.3	13.0
	Loja	484	5.1	10.5
	Saraguro	108	1.1	2.3
	Gualaceo	188	2.0	4.1
	Girón	90	0.9	2.0
	Pujili	119	1.3	2.6
	Cañar	90	0.9	2.0
	Machachi	83	0.9	1.8
	San Gabriel	193	2.0	4.2
	Guaranda	136	1.4	3.0
	Latacunga	294	3.1	6.4
	TOTAL	4,610	48.4	100.00
TOTAL		9,518	100.0	

Table A.3.2

Percent distribution of sample urban households
by city size compared to total urban
population distribution (1974 Population Census).

CITY	1974 Census (N=2,075,877 persons) %	1975/76 Urban Survey (N=9,518 households) %
HIGHLANDS:		
Quito	28.9	11.8
Cities with populations 40,000 or more	13.9	23.0
Cities with populations less than 40,000	2.4	13.7
COAST:		
Guayaquil	39.7	14.9
Cities with populations 40,000 or more	12.2	22.9
Cities with populations less than 40,000	2.9	13.7

TABLE A.3.3

Percent Distribution of Interviews Completed, by Region and Month, Rural Household Budget Surveys I and II, 1978/79

First Survey - RHBS I

Month	Highlands			Coast			Total	
	N	%*	%**	N	%*	%**	N	%
Sept.	231	5.5	9.5	233	5.5	13.0	464	11.0
Oct.	226	5.3	9.3	405	9.6	22.5	631	14.9
Nov.	463	11.0	19.1	339	8.0	18.8	802	19.0
Dec.	338	8.0	13.9	179	4.2	9.9	517	12.2
Jan.	431	10.2	17.8	242	5.7	13.5	673	15.9
Feb.	407	9.6	16.8	353	8.4	19.6	760	18.0
Mar.	241	5.7	9.9	48	1.1	2.7	289	6.8
April	91	2.2	3.7	0	0.0	0.0	91	2.2
Total	2428	57.5	100.0	1799	42.5	100.0	4227	100.0

Second Survey - RHBS II

Month	Highlands			Coast			Total	
	N	%*	%**	N	%*	%**	N	%**
April	200	5.9	8.7	214	5.4	13.0	414	10.5
May	371	9.4	16.1	279	7.1	17.0	650	16.5
June	399	10.1	17.3	310	7.9	18.9	709	18.0
July	447	11.3	19.4	274	6.9	16.7	721	18.3
Aug.	445	11.3	19.3	211	5.3	12.9	656	16.6
Sept.	347	8.8	15.1	353	8.9	21.5	700	17.7
Oct.	96	2.4	4.2	0	0.0	0.0	96	2.4
Total	2305	58.4	100.0	1641	41.6	100.0	3946	100.0

*Percent of total interviews.

**Percent of within-region surveys.

TABLE A.3.4.

Rural Household Budget Surveys, 1978/79:
Geographic Distribution of Sample Households

Province	First Survey '78-79 RHBS-I		Second Survey '79 RHBS-II		Difference (RHBS I - RHBS II)	
	N	%	N	%	N	%
Highlands	2,428	57.5	2,305	58.4	123	43.8
Carchi	102	2.4	99	2.5	3	1.1
Imbabura	172	4.1	164	4.2	8	2.8
Pichincha	443	10.5	414	10.5	29	10.3
Cotopaxi	190	4.5	179	4.5	11	3.9
Tungurahua	215	5.1	206	5.2	9	3.2
Bolivar	161	3.8	152	3.9	9	3.2
Chimborazo	194	4.6	180	4.6	14	5.0
Cañar	193	4.6	186	4.7	7	2.5
Azuay	399	9.4	387	9.8	12	4.3
Loja	359	8.5	338	8.6	21	7.5
Coast	1,799	42.5	1,641	41.6	158	56.2
Esmeraldas	154	3.6	140	3.5	14	5.0
Manabí	585	13.8	534	13.5	51	18.1
Los Rios	319	7.5	292	7.4	27	9.6
Guayas	591	14.0	538	13.6	53	18.9
El Oro	150	3.5	137	3.5	13	4.6
Total	4,227	100.0	3,946	100.0	281	100.0

Table A.3.5.

Percent distribution of sample rural households (1978/7
Rural Household Budget Surveys) by region compared to total
rural population distribution (1974 and 1982 Population Census).

Region:	Total Rural Population				Number of Household Interviews			
	1974 Census		1982 Census		First Survey		Second Survey	
	N	%	N	%	N	%	N	%
Highlands	1,943,769	53.2	2,111,791	54.8	2,428	57.5	2,305	58.4
Coast	1,708,815	46.8	1,743,484	45.2	1,799	42.5	1,641	41.6
TOTAL	3,652,624	100.0	3,855,275	100.0	4,227	100.0	3.946	100.0

Sources: 11, 12.

TABLE A.4.1

Stratification of the UHBS Sample, by REGION, CITYSIZE, APLIANCE
and LFSTAGE: Sub-Sample Sizes

REGION

Highlands	Coast
4610	4908

CITYSIZE

< 40,000	> 40,000	Quito	< 40,000	> 40,000	Guayaquil
1301	2189	1120	1307	2180	1421

APLIANCE

	0	1	2	3+
< 40,000	297	571	302	131
> 40,000	318	630	676	565
Quito	39	269	284	528
< 40,000	579	361	192	175
> 40,000	492	702	411	575
Guayaquil	123	287	246	765

LFSTAGE

	1	2	3	4	5	6
< 40,000	103	144	325	141	304	278
> 40,000	226	292	465	264	540	400
Quito	100	196	221	103	282	206
< 40,000	119	153	333	210	299	191
> 40,000	209	272	565	252	551	330
Guayaquil	135	196	308	161	384	235

TABLE A.4.2.

Stratification of the RHBS Samples, by REGION and Farming Status

	Rural Household Budget Survey I			Rural Household Budget Survey II		
	Highlands	Coast	Total	Highlands	Coast	Total
Farming Households	2002 (47.4)	1203 (28.5)	3205 (75.9)	1975 (50.1)	1186 (30.1)	3161 (80.2)
Non-Farming Households	424 (10.0)	596 (14.1)	1020 (24.1)	330 (8.4)	454 (11.5)	784 (19.9)
Total	2426 (57.4)	1799 (42.6)	4225 (100.0)	2305 (58.4)	1640 (41.6)	3945 (100.0)

Percent of total in parentheses.

TABLE A.4.3

Stratification of farming households by land area under
cultivation, RHBS I and RHBS II.

Land Area Under Cultivation (HECTA)	Rural Household Budget Survey I			Rural Household Budget Survey II		
	Highlands	Coast	Total	Highlands	Coast	Total
Less than 1 ha.	484	68	552	423	77	500
1 - < 2 ha.	575	246	821	565	243	808
2 - < 5 ha.	513	303	816	538	292	830
5 - <10 ha.	230	204	434	246	215	461
≧ 10 ha.	200	382	582	203	359	562
Total	2002	1203	3205	1975	1186	3161

TABLE A.4.4

Stratification of rural non-farming households by
socioeconomic status RHBS I and RHBS II.

Number of Household Facilities (FACILITI)	Rural Household Budget Survey I			Rural Household Budget Survey II		
	Highlands	Coast	Total	Highlands	Coast	Total
0	124	209	333	84	125	209
1	108	133	241	72	91	163
2 - 3	192	254	446	174	238	412
Total	424	596	1020	330	454	784

TABLE A.4.5.

Stratification of rural farming and non-farming households by
household life cycle stage RHBS I and RHBS II

Household Life Cycle Stage	Rural Household Budget Survey I				Rural Household Budget Survey II			
	Highlands		Coast		Highlands		Coast	
	Farming	Non-Farming	Farming	Non-Farming	Farming	Non-Farming	Farming	Non-Farming
1	71	29	100	45	56	21	72	21
2	182	74	139	105	144	55	134	77
3	487	107	294	180	479	84	283	133
4	321	45	214	72	309	31	224	56
5	300	70	241	100	397	53	241	96
6	557	98	214	92	580	84	226	74
Total	1998	423	1202	594	1965	328	1180	453

TABLE A.5.1

Food expenditures patterns of highland urban populations stratified by city size and household life cycle stage

Food Item Category	LT 40,000 LFSTAGE						GT 40,000 LFSTAGE						QUITO LFSTAGE					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
All[a]	50.4 (1.9)	52.0 (1.6)	53.1 (0.9)	54.4 (1.5)	49.7 (0.9)	52.8 (1.1)	40.6 (1.1)	39.3 (0.9)	43.4 (0.8)	44.1 (1.0)	42.1 (0.7)	42.2 (0.9)	36.5 (1.5)	38.6 (1.2)	40.4 (1.2)	41.4 (1.4)	35.3 (0.8)	36.0 (1.2)
41 Key foods[a]	19.6 (1.5)	28.0 (1.1)	30.6 (0.8)	30.5 (1.1)	28.8 (0.7)	28.6 (0.9)	17.0 (1.0)	23.1 (0.7)	25.5 (0.6)	26.4 (0.7)	25.8 (0.5)	23.5 (0.7)	18.1 (1.4)	24.2 (0.9)	26.1 (0.9)	27.8 (1.2)	22.3 (0.6)	21.3 (1.0)
Rice[b]	3.9 (0.4)	5.8 (0.5)	6.7 (0.3)	6.6 (0.5)	6.6 (0.3)	5.5 (0.3)	5.7 (0.5)	7.6 (0.3)	7.9 (0.3)	8.5 (0.3)	8.2 (0.2)	6.9 (0.3)	4.1 (0.4)	5.4 (0.3)	5.8 (0.3)	6.7 (0.4)	5.4 (0.3)	4.5 (0.4)
Bread[b]	3.4 (0.4)	4.5 (0.4)	6.0 (0.3)	7.1 (0.5)	6.0 (0.3)	5.6 (0.3)	5.1 (0.4)	6.1 (0.3)	7.6 (0.2)	8.0 (0.3)	8.2 (0.3)	7.4 (0.3)	4.6 (0.5)	5.6 (0.3)	6.4 (0.3)	6.8 (0.3)	6.4 (0.3)	5.7 (0.3)
Beef (w/bones)[b]	2.8 (0.6)	4.9 (0.7)	5.0 (0.4)	4.1 (0.6)	5.8 (0.5)	4.3 (0.5)	2.1 (0.3)	3.5 (0.3)	4.3 (0.3)	4.5 (0.3)	4.4 (0.2)	3.6 (0.3)	3.8 (0.5)	4.8 (0.4)	5.9 (0.4)	5.8 (0.5)	5.1 (0.3)	4.9 (0.5)
Vegetable lard[b]	0.7 (0.2)	1.6 (0.3)	1.3 (0.1)	1.2 (0.2)	1.2 (0.1)	1.1 (0.2)	1.1 (0.2)	1.2 (0.2)	1.2 (0.1)	1.1 (0.1)	1.2 (0.1)	1.1 (0.1)	1.1 (0.2)	1.6 (0.2)	1.2 (0.1)	1.6 (0.2)	1.2 (0.1)	1.4 (0.2)
Eggs[b]	3.0 (0.4)	2.9 (0.3)	3.1 (0.2)	2.5 (0.3)	2.7 (0.2)	2.7 (0.2)	2.1 (0.2)	3.0 (0.2)	2.8 (0.1)	2.5 (0.2)	2.8 (0.1)	2.8 (0.2)	2.7 (0.3)	3.4 (0.2)	3.2 (0.2)	3.1 (0.2)	3.3 (0.1)	3.2 (0.2)
Milk[b]	5.0 (0.6)	6.0 (0.5)	7.1 (0.3)	6.6 (0.5)	7.1 (0.3)	7.0 (0.4)	4.8 (0.4)	8.8 (0.4)	7.8 (0.3)	8.1 (0.4)	7.4 (0.2)	7.9 (0.2)	7.6 (0.7)	10.4 (0.5)	9.4 (0.5)	9.2 (0.5)	8.7 (0.3)	9.0 (0.5)
Cheese[b]	1.5 (0.2)	1.7 (0.4)	2.0 (0.2)	1.6 (0.2)	2.3 (0.2)	2.2 (0.2)	1.4 (0.4)	1.8 (0.2)	1.5 (0.1)	1.5 (0.1)	1.7 (0.1)	1.8 (0.1)	1.5 (0.2)	1.8 (0.1)	1.7 (0.1)	1.5 (0.2)	1.8 (0.3)	2.1 (0.2)
Onions[b]	0.3 (0.1)	0.5 (0.1)	0.3 (0.1)	0.3 (0.1)	0.3 (0.1)	0.3 (0.1)	0.5 (0.2)	0.7 (0.1)	0.6 (0.0)	0.6 (0.0)	0.6 (0.0)	0.6 (0.0)	0.4 (0.1)	0.6 (0.0)	0.6 (0.0)	0.6 (0.1)	0.7 (0.0)	0.6 (0.0)
Tomatoes[b]	0.9 (0.1)	1.0 (0.1)	1.0 (0.1)	1.1 (0.1)	1.0 (0.1)	1.1 (0.1)	0.8 (0.1)	1.2 (0.1)	1.1 (0.1)	1.2 (0.1)	1.2 (0.1)	0.9 (0.1)	0.9 (0.1)	1.3 (0.1)	1.3 (0.1)	1.1 (0.1)	1.4 (0.1)	1.2 (0.1)
Potatoes[b]	2.5 (0.5)	3.6 (0.6)	4.7 (0.4)	5.4 (0.8)	5.0 (0.5)	3.7 (0.4)	1.9 (0.3)	2.6 (0.3)	2.2 (0.2)	2.8 (0.3)	3.2 (0.3)	2.4 (0.2)	2.3 (0.4)	4.0 (0.3)	4.9 (0.4)	5.6 (0.7)	4.3 (0.3)	3.4 (0.4)
Plantain[b]	0.4 (0.1)	0.7 (0.1)	0.7 (0.1)	0.8 (0.1)	0.7 (0.1)	0.6 (0.1)	0.5 (0.1)	0.6 (0.1)	0.6 (0.1)	0.7 (0.1)	0.7 (0.1)	0.6 (0.1)	0.3 (0.1)	0.5 (0.0)	0.4 (0.0)	0.5 (0.7)	0.5 (0.4)	0.4 (0.5)
Sugar[b]	2.3 (0.3)	3.6 (0.3)	3.9 (0.2)	3.9 (0.3)	3.4 (0.2)	3.9 (0.3)	2.7 (0.2)	3.3 (0.2)	3.6 (0.1)	3.7 (0.2)	3.5 (0.1)	3.4 (0.1)	2.1 (0.2)	2.6 (0.1)	3.0 (0.2)	3.1 (0.3)	2.6 (0.1)	2.2 (0.1)
Coffee (ground)[b]	1.2 (0.2)	1.6 (0.2)	1.9 (0.1)	2.1 (0.3)	1.8 (0.2)	2.0 (0.2)	1.1 (0.1)	1.1 (0.1)	1.2 (0.1)	1.4 (0.1)	1.4 (0.1)	1.5 (0.1)	0.4 (0.1)	0.8 (0.1)	1.0 (0.2)	1.0 (0.1)	1.0 (0.2)	1.3 (0.2)

[a] As percent of total expenditures.

[b] As percent of total food expenditures.

TABLE A 5.2

Food expenditure patterns of coastal urban population stratified by city size and household life cycle stage.

Food Item Category	LT 40,000 LFSTAGE						GT 40,000 LFSTAGE						GUAYAQUIL LFSTAGE					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
All[a]	49.4 (1.5)	52.0 (1.3)	54.7 (0.8)	55.6 (1.0)	52.7 (0.9)	52.7 (1.3)	45.1 (1.1)	46.3 (1.0)	47.7 (0.6)	46.8 (0.9)	44.0 (0.6)	42.4 (0.9)	47.8 (1.3)	37.3 (1.1)	42.8 (1.0)	42.9 (1.3)	36.8 (0.7)	39.3 (1.2)
41 Key foods[a]	.0 (1.7)	35.5 (1.2)	3.97 (0.8)	41.9 (1.0)	38.1 (0.8)	34.3 (1.4)	22.3 (1.2)	30.9 (0.9)	32.2 (0.1)	32.2 (0.8)	29.3 (0.5)	26.2 (0.9)	20.9 (1.3)	22.6 (0.9)	28.5 (0.8)	29.7 (1.1)	24.2 (0.6)	22.6 (1.0)
Rice[b]	12.6 (1.0)	14.4 (0.7)	16.6 (0.5)	19.8 (0.8)	16.2 (0.6)	12.6 (0.7)	8.9 (0.5)	10.7 (0.4)	13.0 (0.3)	14.1 (0.5)	12.4 (0.5)	10.1 (0.4)	7.4 (0.6)	7.7 (0.5)	11.8 (0.5)	11.6 (0.7)	10.0 (0.4)	7.1 (1.0)
Bread[b]	2.3 (0.2)	3.7 (0.4)	3.7 (0.2)	3.4 (0.2)	3.7 (0.2)	3.0 (0.2)	3.0 (0.5)	4.2 (0.2)	4.3 (0.1)	4.7 (0.3)	4.5 (0.2)	3.6 (0.2)	3.1 (0.3)	3.5 (0.2)	4.0 (0.2)	4.5 (0.6)	4.0 (0.2)	3.9 (0.3)
Beef (w/bones)[b]	12.1 (0.9)	11.9 (0.4)	14.4 (0.2)	13.5 (0.2)	14.0 (0.2)	12.1 (0.2)	3.4 (0.4)	4.9 (0.4)	4.4 (0.2)	5.8 (0.5)	5.3 (0.3)	3.9 (0.3)	5.2 (0.8)	5.7 (0.5)	6.5 (0.4)	6.6 (0.5)	6.9 (0.4)	6.4 (0.5)
Vegetable lard[b]	4.1 (0.4)	4.2 (0.2)	4.9 (0.2)	5.2 (0.2)	5.1 (0.2)	4.6 (0.3)	2.5 (0.2)	3.2 (0.2)	3.2 (0.1)	3.4 (0.2)	2.9 (0.1)	2.7 (0.2)	0.6 (0.1)	0.6 (0.1)	0.5 (0.1)	0.9 (0.1)	0.6 (0.1)	0.5 (0.1)
Eggs[b]	1.2 (0.2)	1.5 (0.2)	1.4 (0.1)	1.4 (0.2)	1.3 (0.1)	1.2 (0.1)	1.5 (0.2)	2.8 (0.2)	2.2 (0.1)	1.9 (0.1)	2.2 (0.1)	2.1 (0.1)	1.4 (0.2)	1.8 (0.2)	1.7 (0.1)	1.7 (0.1)	1.8 (0.1)	1.4 (0.1)
Milk[b]	2.4 (0.3)	4.6 (0.5)	3.2 (0.2)	3.4 (0.3)	2.9 (0.2)	2.6 (0.3)	2.1 (0.2)	5.4 (0.4)	4.3 (0.2)	3.8 (0.3)	3.9 (0.3)	4.0 (0.3)	5.6 (0.4)	9.3 (0.6)	7.5 (0.3)	7.7	7.4 (0.3)	7.4 (0.4)
Cheese[b]	1.8 (0.2)	1.7 (0.2)	2.2 (0.1)	2.5 (0.2)	2.2 (0.2)	2.1 (0.2)	2.1 (0.2)	2.4 (0.1)	2.6 (0.1)	2.4 (0.1)	2.5 (0.1)	2.3 (0.1)	1.6 (0.2)	2.0 (0.2)	1.8 (0.1)	1.9 (0.2)	2.0 (0.1)	2.2 (0.2)
Onions[b]	1.5 (0.1)	1.6 (0.1)	1.5 (0.1)	1.6 (0.1)	1.5 (0.1)	1.4 (0.1)	0.9 (0.2)	1.2 (0.1)	1.2 (0.0)	1.2 (0.1)	1.1 (0.0)	1.3 (0.1)	1.3 (0.1)	1.2 (0.1)	1.3 (0.1)	1.3 (0.2)	1.2 (0.1)	1.2 (0.1)
Tomatoes[b]	1.4 (0.1)	2.0 (0.1)	1.8 (0.1)	1.8 (0.1)	1.7 (0.1)	1.3 (0.1)	1.1 (0.1)	1.4 (0.1)	1.3 (0.1)	1.3 (0.1)	1.3 (0.0)	1.4 (0.1)	1.4 (0.1)	1.8 (0.1)	1.7 (0.1)	1.7 (0.1)	1.6 (0.1)	1.4 (0.1)
Potatoes[b]	1.8 (0.1)	1.8 (0.1)	2.0 (0.1)	1.8 (0.1)	2.0 (0.1)	1.7 (0.1)	0.9 (0.1)	1.2 (0.1)	1.4 (0.1)	1.4 (0.1)	1.3 (0.1)	1.1 (0.1)	2.1 (0.3)	2.0 (0.1)	2.3 (0.1)	2.4 (0.1)	2.2 (0.1)	2.0 (0.1)
Plantain[b]	1.1 (0.2)	1.5 (0.1)	1.7 (0.1)	1.8 (0.2)	1.7 (0.1)	1.4 (0.1)	1.5 (0.1)	1.9 (0.1)	2.5 (0.1)	3.1 (0.1)	2.6 (0.1)	2.4 (0.1)	0.7 (0.1)	0.6 (0.1)	0.7 (0.1)	0.7 (0.1)	0.7 (0.1)	0.6 (0.1)
Sugar[b]	2.5 (0.2)	3.4 (0.2)	3.2 (0.1)	3.3 (0.1)	3.2 (0.1)	3.3 (0.2)	2.3 (0.1)	3.1 (0.1)	3.4 (0.1)	3.3 (0.1)	3.3 (0.1)	3.2 (0.1)	1.9 (0.2)	2.2 (0.1)	2.6 (0.1)	2.5 (0.1)	2.3 (0.1)	2.1 (0.1)
Coffee (ground)[b]	1.1 (0.2)	1.2 (0.2)	1.1 (0.1)	1.2 (0.2)	1.4 (0.1)	1.3 (0.2)	0.6 (0.1)	0.6 (0.1)	1.0 (0.1)	1.0 (0.1)	0.9 (0.1)	1.0 (0.1)	0.7 (0.1)	0.7 (0.1)	1.0 (0.1)	1.0 (0.1)	1.0 (0.1)	0.9 (0.1)

[a] As percent of total expenditures.

[b] As percent of total food expenditures.

TABLE A.5.3

Expenditure elasticity coefficients of all foods, key foods
and selected food items, estimated by three functional
models, Urban Household Budget Survey 1975/76

Food Item Category	Double-Log Model	Semi-Log Model	Double-Log Inverse Model
All	.63	.60	.58
41 Key foods	.57	.50	.51
Rice	.19	.15	.11
Bread	.48	.43	.42
Beef (w/bones)	.32	.33	.29
Vegetable lard	.17	.17	.10
Eggs	.67	.61	.65
Milk	.65	.56	.64
Cheese	.62	.57	.62
Onions	.36	.36	.34
Tomatoes	.46	.44	.43
Potatoes	.41	.35	.38
Plantain	.17	.13	.15
Sugar	.30	.33	.28
Coffee (ground)	.41	.39	.40

TABLE A.5.4
Percent of Farming Households Reporting Household
Production as Source of Food Supply,
Selected Food Items
Rural Household Budget Surveys I and II

Food Commodity	Rural Household Budget Survey I		Rural Household Budget Survey II	
	Highlands n=2002	Coast n=1203	Highlands n=1975	Coast n=1186
	%	%	%	%
Rice	0.0	12.5	0.2	5.5
Maize	45.5	16.5	33.2	22.2
Dry beans	24.2	3.5	17.0	5.1
Onions	3.3	0.3	3.8	0.6
Tomatoes	0.1	0.2	0.3	0.6
Potatoes	14.8	0.5	14.6	0.7
Plantain	5.2	23.9	5.9	30.2
Beef	1.2	0.2	0.8	0.2
Pork	11.3	4.8	11.8	5.2
Milk	28.7	17.0	30.3	18.5
Cheese	5.6	9.6	6.3	11.4
Eggs	53.4	65.5	65.4	79.0

TABLE A.6.1

Mean per capita expenditures on health care of highland urban
household stratified by city-size and socio-economic status

X(SE)

S/.

Health Care Category	LT 40,000 APLIANCE				GT 40,000 APLIANCE				QUITO APLIANCE			
	0	1	2	3+	0	1	2	3+	0	1	2	3+
All	342 (55)	397 (72)	483 (60)	557 (122)	365 (38)	645 (73)	731 (50)	1277 (138)	336 (97)	463 (81)	651 (64)	2195 (367)
Outpatient visits	60 (29)	36 (11)	49 (11)	20 (6)	38 (6)	62 (10)	65 (6)	90 (8)	44 (24)	63 (13)	123 (23)	329 (31)
Dental care	7 (4)	16 (6)	30 (8)	39 (12)	16 (5)	44 (9)	42 (6)	88 (12)	1 (1)	33 (14)	38 (7)	146 (20)
Medicines and drugs	208 (40)	232 (56)	351 (50)	354 (84)	261 (26)	355 (35)	436 (31)	667 (55)	279 (81)	284 (47)	400 (43)	844 (67)

( )Standard error.

TABLE A.6.2

Mean per capita expenditures on health care of coastal urban households stratified by city-size and socio-economic status

X(SE)

S/.

Health Care Category	LT 40,000 APLIANCE				GT 40,000 APLIANCE				GUAYAQUIL APLIANCE			
	0	1	2	3+	0	1	2	3+	0	1	2	3+
All	239 (24)	293 (30)	574 (80)	811 (113)	265 (28)	380 (33)	539 (56)	775 (63)	218 (54)	364 (68)	984 (394)	1428 (132)
Outpatient visits	43 (4)	57 (13)	140 (27)	100 (18)	22 (3)	34 (4)	39 (4)	58 (7)	35 (9)	45 (8)	69 (17)	163 (18)
Dental care	3 (1)	6 (3)	7 (3)	15 (9)	4 (1)	14 (7)	21 (8)	19 (4)	1 (1)	2 (1)	12 (7)	61 (13)
Medicines and drugs	168 (20)	211 (24)	389 (66)	522 (79)	212 (23)	293 (26)	437 (50)	559 (43)	152 (38)	252 (48)	579 (202)	812 (63)

( ) standard error.